AN ABSTRACT OF THE DISSERTATION OF

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Unknown questions remain concerning the health of migrant farm workers, seasonal farm workers, and other rural poor people. The objectives of this study were to determine the demographic profile of a sample from a Community and Migrant Health Center; to determine the prevalence of disease in migrant farm workers, seasonal farm workers and other clients; and to determine if differences existed in the prevalence of disease between the three occupational groups.

Information from medical records for clients who visited an Oregon Community and Migrant Health Center during 1993 was abstracted to determine whether differences existed in demographic characteristics and in health status between migrant farm workers, seasonal farm workers, and other clients. A random sample of 600 medical charts was selected from the three occupational groups stratified by sex. The sample included adults and children classified as migrant or seasonal farm workers and other clients. Data abstracted from charts included socio-demographic information, physiologic measurements, biochemical testing results, and disease prevalence.

Clients in this sample represented Latino (85.17%), Russian (4.8%), and Anglo (10%) cultures. Female clients who were not migrant or seasonal farm workers had a mean age of 27.42 years which was significantly different from the mean age of female migrant farm workers of 18.95 years, and of female seasonal farm workers of 20.35 years. Females who were not migrant or seasonal farm workers had significantly higher mean body mass indexes, and systolic and diastolic blood pressures.

Female children classified as migrant farm worker had significantly higher blood lead levels than female children whose parents were not migrant or seasonal farm workers. Glucose levels for migrant farm workers was significantly higher than either of the other two occupational groups. Findings of the study indicated that common diagnoses included upper respiratory infection, otitis media, intestinal parasites or pathogens, dermatitis, and urinary tract infection. The most commonly reported injuries were due to lacerations and motor vehicle accidents. Additionally, 31.57% of PAP tests were abnormal, and violence against girls and women was reported. Diagnoses of chronic diseases included diabetes, hypertension, AIDS, cancer, and heart disease.

Health Status in Migrant and Seasonal Farm Workers, and Other Clients in a Community and Migrant Health Center

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Marsha Greer, Author

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CHAPTER I

INTRODUCTION

An estimated 4.2 million migrant and seasonal farm workers and their families plant, harvest, and pack much of this nation's fruit and vegetables. Additionally, they perform much of the nation's nursery and Christmas tree work yet they continue to earn wages that are often below the federal poverty line. Poverty, in combination with substandard conditions in the living and working environment, may result in a health status for migrant and seasonal farmworkers similar to that found in less developed nations. Other people living in poverty in the United States, however, may have safety nets that may not be available to migrant and seasonal farm workers. Safety nets may allow the poor to seek health care, may assist with food or housing, and may provide income following injury or illness. Safety nets available to the rest of the poor are often unavailable to migrant farm workers (Slesinger and Ofstead, 1993).

The actual health status of migrant and seasonal farm workers is unknown. There is no population-wide data base for migrant health status (Galarneau, 1992). Many studies concerning migrant and seasonal farm worker health are out dated (Rust, 1990; Galarneau, 1992; Martaus, 1986). Past studies often compared migrant farm worker health status to the national averages for health which may be inappropriate due to factors in migrant farm worker lives that may not reflect those of the general population. Specifically these factors include persistent low income, occupational exposures that may not be found in the general population, substandard living conditions, and a migratory lifestyle (Rust, 1990; Meister, 1991). Rust (1990) points out that few studies have been done comparing migrant and seasonal farm worker health status to a similar low income group. Additionally, few

studies address the health of seasonal farm workers as a group separate from migrant farm workers.

There has never been a national study to determine the health status of migrant and seasonal farm workers (Meister, 1991; Rust, 1990; Galarneau, 1992; General Accounting Office, 1991). Consequently, many health indicators for the health of migrant and seasonal farm workers are unknown or are based on locale-specific studies (National Advisory Council on Migrant Health, 1993).

Most migrant farm workers live in poverty as do many seasonal farm workers. In addition to financial constraints, many migrant and seasonal farm workers face cultural and language barriers when seeking health care (Trotter, 1988; Meister, 1991). Financial barriers keep many poor from seeking preventive health care. One source of care for the poor, including migrant and seasonal farm workers, is community and migrant health centers which were established to provide primary health care for the broad spectrum of the medically underserved (National Association of Community Health Centers, Inc., 1993).

Migrant farmworkers presumably exhibit all the health problems other poor populations have, but their problems are compounded by their migratory lifestyle (Rust, 1990; Dever, 1991; Galarneau, 1992). Migration prohibits people from getting consistent health care when it is necessary. Moving from place to place impacts the ability of the provider to get an accurate assessment of the health of a client and may impair treatment of the client's diseases or injuries. Migration of the farm worker population makes research and the determination of health status difficult especially in light of the fact that the total number of migrant farm workers is unknown. Therefore, population-based research is not possible (Meister, 1991).

Previous studies often lumped migrant and seasonal farm workers into one group for study. Few studies have been done comparing migrant farm workers, seasonal farm workers, and a similar socioeconomic group. Social class, including income, occupation, and level of education, has been shown to be related to disease and mortality (Liberatos,

Link, and Kelsey, 1988; Navarro, 1990; Krieger, 1992). Social classes of clients who seek care in community and migrant health centers characteristically include medically underserved people who are: uninsured low income or unemployed, migrant or seasonal farm workers, and little or no formal education (National Association of Community Health Centers, 1993). Studies of similar social classes in relationship to other variables are necessary to give community and migrant health centers complete information about their clients so they may better serve their populations, and to give policy makers a more complete database on which to set national policy concerning health care services, education, labor, and housing.

Purpose of the Study

The purpose of this study was to determine the prevalence of diseases in selected clients who were migrant farm workers, seasonal farm workers, and clients who were not migrant or seasonal farm workers who sought health care at an Oregon Community and Migrant Health Center.

The objectives of the research were:

1) To determine the demographic profile of a sample of the clinic population,

2) To determine the prevalence of disease in a sample of migrant farm workers, seasonal farm workers, and clients who were not migrant or seasonal farm workers in a selected Community and Migrant Health Center,

3) To determine whether differences existed in the prevalence of disease for the three occupational groupings (migrant farm worker, seasonal farm worker, not migrant or seasonal farm worker).

Research Questions

Several research questions were considered in this study.

1) What is the demographic profile of the sample population (age, household income, cultural composition, and number of visits to the clinic)?

2) What is the prevalence of selected diseases for migrant farm workers, for seasonal farm workers, and for those who are not migrant or seasonal farm workers in a sample of clients from a community and migrant health center?

3) Are there illnesses or diseases found in migrant and seasonal farm workers that are not found in clients who are not migrant or seasonal farm workers?

4) Are there differences in the prevalence of diseases by occupation after controlling for sex and age?

Hypotheses

The following null hypotheses were tested:

1) There will be no significant differences between migrant farm workers, seasonal farm workers, and clients who are not migrant or seasonal farm workers with respect to selected demographic variables. Demographic variables include age, ethnicity, household income, and number of visits to the clinic.

2) There will be no significant difference in selected physiologic measurements between migrant farm workers, seasonal farm workers, or clients who are not migrant or seasonal farm workers. Physiologic measurements include weight and height as body mass index, systolic blood pressure, and diastolic blood pressure.

3) There will be no significant differences in biochemical measurements between migrant farm workers, seasonal farm workers, or clients who are not migrant or seasonal farm workers. Biochemical measurements include blood lead levels, cholesterol,

triglycerides, high density lipoproteins, low density lipoproteins, glucose, and hemoglobin.

4) There will be no significant differences in the prevalence of disease or injury between migrant farm workers, seasonal farm workers, and clients who are not migrant or seasonal farm worker clients.

Significance of the Study

More information is needed concerning prevalence of disease, socioeconomic status, and relationship of health in migrant and seasonal populations compared to that of similar low income groups. Important insights about the health of migrant and seasonal farm workers and further questions for research to be conducted on a national level can be illuminated by regional or local studies.

This study will serve as a benchmark for future research by establishing a database for future prospective studies, particularly in the clinic where this study was conducted. A three-way analysis of the health status of migrant farm workers, seasonal farm workers, and clients who were not migrant or seasonal farm workers, stratified by gender and age, provides information not readily available to clinicians and staff at the Community and Migrant Health Center, and to county and state agencies who work with these populations.

Persistent poverty is a hallmark not only of migrant and seasonal farm workers but also of much of the rural population in the United States. The rural poor work but remain poor. Poverty and access to health care for much of the rural population continues to be ignored by many policy makers as plans for national health care reform emerge. Marginalization of populations based on income, gender, or race/ethnicity/culture forces people to make choices they might otherwise not select. These forced choices may affect long term or short term health outcomes. More Public Health research needs to be done to examine data using disaggregated by gender and income. This study attempts to provide information about the prevalence of disease in female and male clients of a community and

migrant health center who were migrant farm workers, seasonal farm workers, and clients who were not migrant or seasonal farm workers. Clients in the sample community and migrant health center are predominantly low income with many falling below the federal poverty line.

Limitations

Descriptive research is important as a fact-finding tool and as the initial research necessary to lay the foundation for future predictive research. Additionally, descriptive studies can provide prevalence information and other aspects of the distribution that may, in combination with demographic and socio-economic variables, establish links between factors. There are limitations, however:

1) This study focuses on those in low income populations who sought health care at the selected health center. A more representative study would involve an assessment of the health status of the overall migrant and seasonal farmworker population and other poor people in the community.

2) Migrant farm workers who are sick may not have migrated to the service area to work.

3) This form of study, a static survey, depends on the accuracy of records, which may neither be accurate nor consistent since many providers are responsible for documenting client visits. There are records checks and standard formats that providers follow to improve accuracy and consistency, but there is still a margin for error.

Delimitations

Any one clinic is area-specific and results may not be generalizable to other areas. The study population may have different income levels, may have different occupational hazards, and may be of different ages than other Community and Migrant Health Center

populations. Clients in other regions or locales may have more or less access to the community and migrant health centers or other health care programs and therefore may or may not be like this sample.

Definition of Terms

Disease: Diagnosed disease as listed in the medical records which conform to the International Classification of Disease (Benenson, 1990).

Physiologic measures: Include measures of height, weight, systolic blood pressure, and diastolic blood pressure.

Biochemical measures: Include blood lead level, hemoglobin, triglycerides, cholesterol, high density lipoproteins, low density lipoproteins, and glucose.

Migrant farm worker: An individual or family member who is employed in agricultural labor of a seasonal or other temporary nature, and who is required to be absent overnight from his or her permanent place of residence. Children who live in this household are classified as migrant farm worker in clinic records.

Seasonal farm worker: An individual or family member who is employed in agricultural labor of a seasonal or other temporary nature and is not required to be absent overnight from his or her permanent place of residence. Children who live in this household are classified as seasonal farm worker in clinic records.

Not migrant or seasonal farm worker: Clients who sought health care at the clinic and who were not classified as migrant or seasonal farm workers by clinic staff.

Agricultural or farm labor: Work related to planting, cultivating, or harvesting operations; or work in canning, packing, ginning, processing operations, or seed conditioning and related research; or work in reforestation activities, Christmas tree harvesting, or nursery production.

Poverty: From the economic and productive perspective, inadequate income to provide minimally acceptable standards of food, shelter, and clothing; falling at or below the

federally established income level that defines poverty. From a socio-cultural perspective, misery, unhappiness, degradation, marginality and the experience of being disenfranchised and deprived (Bould-Van Til, 1977). Both components are considered in this study.

Culture: The way of life of a people including ideas, customs, beliefs, and behavior including adaptations to the environment in which they live.

Russian: Two groups of Russians live in the service area. Old Believer Russians who immigrated to the area during the 1960s retain many of their old world customs and beliefs (including a preference for using midwives and home remedies, and who have a high fertility rate). Soviet refugee families are recent immigrants and tend to adopt the ways of the culture in the United States.

Anglo: Cultural term referring to people of European descent who are not Latino or who are not Russian-speaking peoples.

Hispanic or Latino: People of Hispanic or Latino descent. In this study, Hispanics are primarily Mexican, Mexican-American, and Central American and culturally are represented by Latino culture. The terms Hispanic and Latino are used interchangeably throughout this paper.

CHAPTER II

REVIEW OF LITERATURE

The literature review is divided into four sections. The first section provides a discussion of the relationship between social class and health status. The second section reviews literature regarding migrant and seasonal farm worker living and working conditions including legislation that impacts on health status. The third section reviews literature concerning the health status of migrant and seasonal farm workers and the rural poor. The final section reviews information about the study area in Oregon.

Social Class and Health Status

A strong relationship exists between health status and social class as indicated by income level, occupation, and educational level (Liberatos, Link and Kelsey, 1988; Navarro, 1990; Syme and Berkman, 1986; Bassett and Krieger, 1986; U.S. DHHS, 1992). Consistently studies have shown that people in the lower class have higher morbidity, mortality, and disability rates (Liberatos, Link, Kelsey, 1988; Navarro, 1990). Studies have shown that each of the three indicators of social class has been associated with health outcomes "independent of the other two" (Liberatos, Link, Kelsey, 1988, p. 106).

Occupation, Education, Income

Occupation has been used as a single indictor of social class because public opinion assigns esteem or prestige to certain occupations based on educational requirement of the job, and on salary or pay from the occupation (Liberatos, Link, Kelsey, 1988). There is also often a public perception that income associated with some occupations allows one access to adequate housing, medical or health care, a good diet, less exposure to a toxic environment, and better work conditions. Occupation alone could be found to have a

strong association with disease or injury such as low back pain if the job involved stoop labor or heavy lifting (Liberatos, Link, Kelsey, 1988). Occupation also may be related to toxic or hazardous exposures to chemicals, natural environmental exposures, or hazardous equipment and many times these jobs are perceived as lower class jobs (Liberatos, Link, Kelsey, 1988; Syme and Berkman, 1981).

Occupation alone as an indicator of social class may be misleading where income may be inconsistent with the educational requirements of the job. For example, a garbage collector may earn more than a school teacher although the teacher may have more formal education and may be accorded a higher social status by society (Liberatos, Link, Kelsey, 1988).

Education is more stable over time and it is easier to accurately assess than the other two indicators (Liberatos, Link, Kelsey, 1988). Years of schooling remains constant for most people after the age of 20 and may be a good indicator or social class. People with little education tend to be found in less skilled jobs which are often seen as lower status jobs. Jobs requiring less skill tend to be lower paying jobs that may involve exposure to more hazards. Schooling is seen by many Americans as a means for upward mobility to a higher paying job and higher class status (Martin, 1990). Upward mobility is often seen as a way to leave life in an unhealthy environment behind (Liberatos, Link, Kelsey, 1988).

Many studies show a strong association between years of schooling and health outcomes. "Education is frequently more strongly associated with disease than are other indicators" (Liberatos, Link, Kelsey, 1988, p. 99). Several studies found years of formal schooling as the best predictor of coronary heart disease (Jacobsen and Thelle, 1988), breast cancer (MacMahon et al, 1970), and health practices (Zurayk, Halabi, and Deeb, 1987). In spite of the higher social status accorded to higher levels of education or more years of formal schooling, education does not necessarily precede higher income and occupational attainment (Liberatos, Link, Kelsey, 1988).

As mentioned earlier occupation may not alone be the best indicator of social class. Income also may not be appropriate as a single indicator of social class because it may not be consistent with educational level (Liberatos, Link, Kelsey, 1988). Social class is often linked to poor health outcomes although more research is required to determine the exact relationships and interrelationships with other factors such as lifestyle, genetics, and acculturation (Syme and Berkman, 1981; Fuchs, 1992; Liberatos, Link, Kelsey, 1988). Taken as a composite, social class indicators consistently are highly associated with health outcomes. One of the indicators of social class that has consistently been shown in studies conducted worldwide to adversely affect health is low income or economic poverty (Martin, 1990; Navarro, 1990; Jacobson 1993).

Economic Poverty and Health

Economic poverty often means that a household (one person or more) has insufficient income to allow the household the means to provide basic necessities such as adequate nutrition, safe water, adequate shelter, and preventive health care. Economic poverty in the United States is defined by the government using an absolute approach of a prescribed income level and household size. Household income falling above the line is considered adequate to meet the needs of the household while income falling below the line is considered inadequate to meet the needs of the household. The poverty line varies based on the size of the household (U.S. Bureau of the Census, 1992). One problem with an absolute approach is that the quality of life for people below the line, at the line or above the line is not addressed and people may move back and forth over the line over time (Schiller, 1989). The inability to provide basic necessities may exist regardless of the establishment of a poverty line. Low income is linked to diseases and injuries (Liberatos, Link, Kelsey, 1988; Navarro, 1990)

Many studies, including those conducted in developing or "third world" nations, show that diseases of poverty can consistently be found in the poorest peoples of the world

(Jacobson 1993). Health outcomes found in the poor in the United States are similar to those found in "third world" nations including the impoverished and deprived peoples living in Nepal (Ali, 1991), Uganda, Mexico (Stebbins, 1993) as well as many other developing nations. Diarrhea, parasitic infestations, pneumonia, and infectious diseases are especially prevalent among the peoples living in poverty in conditions where inadequate water and sanitation is the norm, where substandard housing conditions exist, and where access to preventive or primary health care is lacking (Jacobson 1993; USAID 1992).

Low income in the United States is a special risk factor for mortality and morbidity. "Health disparities between poor people and those with higher incomes are almost universal for all dimensions of health" (U.S. DHHS, 1992, p. 29). Common symptoms of ill health seen in low income populations include malnutrition, chronic fatigue, chronic anemia, increased susceptibility to infections of the reproductive and respiratory tracts, and premature deaths (Jacobson, 1993; Liberatos, Link, and Kelsey, 1988). Parasitic and infectious diseases are found in high rates in low income groups (Syme and Berkman, 1981).

Poverty as a risk factor for pregnant women increases the chances of infant mortality, and childhood chronic disease and traumatic death (Jacobson, 1993; Starr, 1981; Navarro, 1990; U.S. DHHS, 1992). Poor pregnancy outcomes including premature birth, low birth weight, birth defects, and infant deaths are linked to low occupational status, low educational level, and low income of the mother (U.S. DHHS, 1992; Rosenbaum, 1992).

The relationship between childhood poverty and health status has been extensively documented. Poor children are more likely than nonpoor children to be born at low birthweight, die in infancy and childhood from preventable health conditions (U.S. DHHS, 1992). Poor children suffer more sickness from infection than does the total population. Poor children are also more likely to be seriously affected when they do become ill (Rosenbaum, 1992). Additionally, poor children are exposed to more environmental

hazards which place them at greater risk for contact with toxics and for injury (U.S.DHHS, 1992).

One of the exposures with severe consequences on neurological development of children includes exposure to lead. Blood lead levels exceeding 15mg/dL, which are levels that increase the risk for impaired mental and physical development, are found more often in children of low income (U.S. DHHS, 1992). Low socioeconomic status is highly related to children's death and injury as a result of drowning, suffocation, and fire (U.S. DHHS, 1992).

Health problems related to poor nutrition and hunger are more prevalent among the poor than in the overall population (Samuels and Smith, 1992). Key nutrition studies of recent years found that the prevalence of iron deficiency is greater in women below the poverty line than in women above it (Shotland, 1989; Greenstein, 1992). Additionally, studies found that the risk of nutrition-related disorders is generally greater in low-income groups than in groups with higher incomes and that the rate of anemia is substantially higher among poor children below the age of 4 than among nonpoor children in this age group (U.S. DHHS, 1992; Shotland, 1989; Greenstein, 1992). Data from the National Household Food Consumption Survey provide compelling evidence that the single most important factor is lack of adequate resources to buy sufficient food rather than poor food choices or lack of nutrition education (Greenstein, 1992).

Low income is a risk factor for the chronic diseases that are the leading causes of deaths in the United States (Center for Health Economics Research, 1993). Poor women with cervical cancer and breast cancer are more likely to get diagnosed at a late stage (Center for Health Economics Research, 1993). Poor people are less likely to receive primary care for heart problems. Adults living in poor areas are five times more likely than the general population to be hospitalized with congestive heart failure and asthma and about four times as likely to be hospitalized with bacterial pneumonia (Center for Health Economics Research, 1993). Low income people have a 25 percent higher risk then the

overall population of death from heart disease (U.S. DHHS, 1992). "The incidence of cancer increases as family income decreases, and survival rates are lower for low-income cancer patients" (U.S. DHHS, 1992, p. 30). Tuberculosis and HIV infection as well as other infectious diseases are "found disproportionately among the poor" (U.S. DHHS, 1992, p. 30).

Many of the health outcomes may be linked to the fact that many poor people delay seeking health care until a disease progresses to a severe stage (Muller, 1988; Sidel and Sidel, 1981). Barriers that limit poor people from seeking care include cost, transportation, lack of child care, loss of pay to miss work, long waits to see the provider, cultural barriers, and imposing institutions (Sidel and Sidel, 1981; Riessman, 1981; Muller, 1988). Some of these barriers involve social conditions that may also effect health.

Social Poverty and Health

As mentioned earlier, poverty also encompasses social aspects. Society's definition or perception of the poor as well as the marginalized life the poor person lives may have a negative effect on a person's health (Lillie-Blanton et al, 1993). Poverty is a process involving and evolving over time, and it is a social state involving interactions with others. Poor people in the United States are often seen as "them," as outsiders (Katz, 1989), as "those people" (Vice President Dan Quayle in his debate with Senator Lloyd Bentsen), and as less deserving than the non poor (Roth, 1989). Poverty is perceived by many to be attributable to some character flaw, to a personal defect, to individual behavior, or to choice (Katz, 1989; Schiller, 1989; Martin, 1990; Bould - Van Til, 1977). Blakely (1992) points out that "until recently, the notion that a little bit of assistance and good character would lift anyone out of poverty was dogma," (p. 248). The rationale then, is that there must be a character flaw if someone remains in poverty. Mass media presents stories and pictures which show the poor as "...violent, drug dealing, immoral, anti-social, lazy, and

exploitative of children's welfare benefits," (Blakely, 1992 p. 248). The social cost of these perceptions is the cost to the poor themselves as well as to society.

Some people living at or near the poverty line may have a very comfortable, spiritually rich life (Schiller, 1989; Mies and Shiva, 1993). Others may constantly worry about the next check and how to pay the bills. If an illness, injury or unexpected event occurs, the cost of that event may cause the household to slip into poverty and to be in jeopardy of losing shelter, food, or other necessities. Living in a society that views the poor as undeserving or flawed may place additional stress on the daily lives of the poor (Lillie-Blanton et al, 1993; Schiller, 1989). Many studies have shown that the economically poor suffer higher rates of schizophrenia, are more worried, more anxious, and less hopeful about the future than are those in higher economic groups (Syme and Berkman, 1989; U.S. DHHS, 1991). Social deprivation, stigmatization, marginalization, and lack of acceptance may increase stress in economically poor people (Martin, 1990; Lillie-Blanton et al, 1993; Padfield and Young, 1977). Unemployment may increase tensions in a household and may have a negative effect on family dynamics perhaps even to the point of breaking up the family (Martin, 1990; Camasso and Camasso, 1986).

The cost to society of having a population that is persistently poor is tremendous. Many who grow up in poverty are prevented from developing to their full potential (Bould-Van Til, 1977). Many who grow up in poverty suffer the effects of malnourishment and underdevelopment. Low educational achievement may establish a pattern for a future of low income. Coping mechanisms for some may include alcohol or other substance abuse, hostility, depression, and violence (Bould - Van Til, 1977). Those kept in the margins by the dominant culture may not fully contribute to the productivity of the society and lack the power to change that social and power structure (Bould - Van Til, 1977; Padfield and Young, 1977). Community harmony necessary for problem solving may not exist. Enclaves of poor exist based on culture, geographic location, income, and minority status among other characteristics (Padfield and Young, 1977).

Rural Poverty and Health

The rural population in the United States is at an all time high since 1890 (Wimberley, 1993). Many of the poorest people in this nation live in rural areas (Rural Sociological Society, 1993). The rural poor differ from the urban poor in several ways. In rural areas, households generally consist of a two-parent household (Dudenhefer, 1993). Generally at least on of the parents is working. In many cases work is found away from farming the land. Isolation is common in rural areas and getting around necessitates having a means of transportation such as a car or truck (Richardson, 1988). Fewer health services exist in rural areas which means access to health services may be less than in urban areas (Galarneau, 1992; Richardson, 1988). Child labor, particularly in agriculture, may be relied on to make ends meet financially. Child labor is a key factor in suggesting poverty in any society (Drenovsky, 1992).

Not only do the rural poor live in economic and social poverty but, they often live in persistent poverty (Rural Sociological Society, 1993; Lapping, Daniels, and Keller, 1989). Usually at least one member of a rural household works year after year yet, the income level remains at or near poverty. In 1975 the President's National Advisory Commission on Rural Poverty reported that rural poverty was so widespread, and so acute, that it was a national disgrace (President's National Advisory Commission on Rural Poverty, 1978). In spite of that critique, there has not been a national social policy or plan for rural America. What began as farm policy remains in place and that policy does not contain strategies to alleviate rural poverty or to improve social conditions for the rural poor (Dudenhefer, 1993; Wimberley, 1993).

The rural poverty rate rose from 13.5 percent in 1978 to 15.7 percent in 1989. In 1990 there were 9 million rural poor or 16.1% of the 56 million rural population living in rural areas in the United States (Dudenhefer, 1993). Forty-four percent of the rural poor lived in married couple families in 1990. Fourteen percent of the rural poor were 65 years

or older. Two-thirds of the rural poor worked in the labor force (Rural Sociological Society Task Force on Persistent Poverty in Rural America, 1993). High school dropout rates in rural areas in 1985 were 15.2 percent. Even when rural workers had the same amount of schooling as urban workers, experience and education commanded less pay in rural areas than in urban areas (McLaughlin and Perman, 1991).

Poverty rates in rural areas in 1989 for all ethnicities and races was 15.9%. The rate for Mexicans in poverty was more than twice that of the total rural poverty rate or 37.9% compared to 34.5% for Hispanic and 8.4% for White (Dudenhefer, 1993). Low wages and inadequate employment opportunities mean that even though people are working they remain in poverty or near poverty often moving back and forth across the poverty line (Saenz and Ballejos, 1993; Dudenhefer, 1993).

Studies of health in rural areas reveal differences between rural and urban outcomes (Richardson, 1988). Higher rates of chronic conditions are found in rural areas than in urban areas. Rural residents see physicians less often with 4.5 contacts per year compare to 5.3 for urban residents. Rural poor women tend to be more poor than urban poor women and often work in lower paying and more hazardous jobs (Richardson, 1988). Richardson (1988) also points out that for minority women in the rural areas occupational problems may be intensified by language, racism, and other cultural barriers.

Social class including occupation, education, and income, especially low income or poverty is linked to health status. Migrant and seasonal farm workers represent a segment of society that has low income, little education, and a hazardous work environment.

Migrant and Seasonal Farm Worker Living and Working Conditions

The migrant streams as we know them today resulted from the need for seasonal farm labor at a time when mechanization did not exist and there was excess supply of food crops to harvest. After the Civil War, economic and social conditions led to the beginning of the migrant streams with characteristics that remain today.

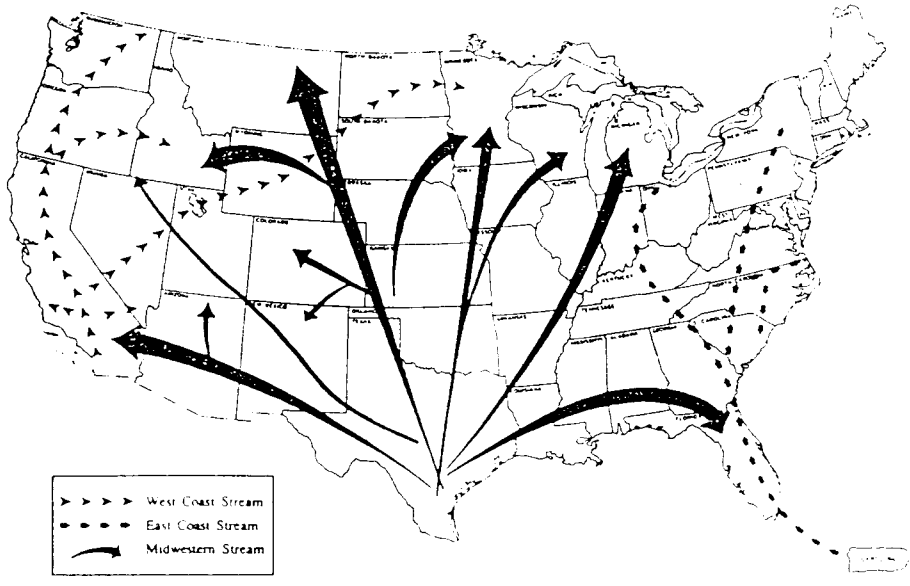
Background

An estimated 4.2 million migrant and seasonal farm workers plant, harvest, and pack much of this nation's fruit and vegetables (MMWR, 1992; Goldfarb, 1981; Dever, 1991). About 80% of migrant farm workers are U.S. citizens (Goldsmith, 1989). The exact number of migrant and seasonal farm workers is unknown because there has never been a national study to determine the exact number (Meister, 1991; Galarneau, 1992). Another reason that the actual numbers of migrant and seasonal workers in the United States is unknown is that the definition for "migrant" and "seasonal" farm worker varies by federal, state and organization directives (Meister 1991; Rust 1990). In essence, migrant farm workers are people who leave their principal place of residence to work in seasonal employment and then return to their home base. The Office of Migrant Health's definition for a migrant farm worker is "an individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the last 24 months and who establishes for the purpose of such employment a temporary abode" (U.S. Department of Health and Human Services, 1990). Solo males traveling without their families, women traveling alone, children living in a household where a parent is a migrant farm worker as well as families working as migrant farm workers, may be defined as migrant farm workers. The Office of Migrant Health defines seasonal farm workers as people whose principal employment in agricultural work is performed on a seasonal basis (Rust 1990; U.S. Department of Health and Human Services, 1990). Seasonal farm workers, who work cyclically but do not migrate, comprise about two thirds of the estimated migrant and seasonal farmworker population (Meister, 1991).

Migrant farm workers in the United States are home-based in Mexico, Puerto Rico, Jamaica, Central American nations, or in states including Texas, California, Florida, and Arizona. From these home bases, the migrants move into three major "streams" (Trotter, 1988; National Migrant Resource Program, Inc., 1993).

The East Coast stream begins in Florida and moves up the Atlantic coast to the northern states (Table 2.1). This stream is the most diverse ethnically and includes Mexican Americans, Mexicans, Central American Refugees, Puerto Ricans, Haitians, African Americans, Jamaicans, and Appalachian Anglos. The central stream, comprised primarily of Mexican Americans, originates in Texas and moves through the Midwest, into the Rocky Mountain states, and into the southwestern states. A West Coast stream originates in Arizona and California and moves north into Idaho, Oregon and Washington with many migrants settling out of the stream in those areas. The ethnic composition of this stream includes Mexican Americans, Mexicans, Central Americans, Anglos, Russian immigrants, and Southeast Asian immigrants (National Migrant Resource Program, Inc., 1993).

Table 2.1 Major Migrant Streams in the United States



Source: Prepared by the National Migrant Resource Program, Austin, Texas; used by permission.

Characteristically, migrant farm workers move into the stream to work a specific type of crop (i.e. fruit trees or ground crops) and they move northward as crops mature. Many migrant and seasonal farm workers work specific crops in order to become as fast as possible at harvesting a particular product since time is money. When many crops are in season it is imperative to move as quickly as possible to prevent spoilage. After the season ends in the north migrant farm workers make their way back to their home base.

Historically, migrant and seasonal farm workers were needed to harvest the excess supply or crops. Today legislation and an excess supply of crops encourages migrant and seasonal workers to live and work, often in substandard conditions, in order to harvest crops across the United States (Dudenhefer, 1993; Goldsmith, .

Research shows that since the turn of this century migrant farm workers have suffered economic and social discrimination, and unhealthy living and working conditions (Goldfarb, 1981; Linder, 1992). For nearly 50 years the working and living conditions of migrant farm workers have been studied and made public. But, for 50 years few changes have occurred in the working and living conditions that migrant and seasonal farm workers endure (Nelson, 1951; Goldfarb, 1981; Leland, 1989; Valdés, 1995)

John Steinbeck's *The Grapes of Wrath* called attention to the inhumane living and working conditions for those providing much of this nation's food. Edward R. Murrow produced *Harvest of Shame* in 1948 which was broadcast by CBS into millions of homes. Murrow revealed a grim picture of workers lives and health. Housing without water or sanitation and often without protection to natural elements was found the norm for migrant farm workers. Children and adults without adequate food were shown as gaunt and frail disadvantaged people.

Nelson (1951), writing for the National Planning Association Agriculture Committee on National Policy about migratory workers, indicated that "...there is no major problem in American rural life about which so much has been said and written and so little action taken" (p. 1). Twenty-two years after Murrow's production, Chet Huntley re-

examined the situation and found no improvement. Living and working conditions remained deplorable. Substandard housing, lack of nutrition, child labor, and lack of water and sanitation characterized living conditions. Work was performed without adequate pay in a work environment without adequate water and sanitation.

In the 1970s the Public Broadcasting System produced a television program called *A Day Without Sunshine* about farm worker lives in the Florida orange groves and "...the powerful political process that deadingly defeats periodic attempts to improve their lives" (Goldfarb, 1981, p. xii). During the 1972 hearings before the Senate Subcommittee on Migratory Labor, one medical witness stated "Most of these people live constantly at the brink of medical disaster, hoping that the symptoms they have or the pain they feel will prove transient or can somehow be survived, for they know that no help is available to them" (Goldfarb, 1981, p. 34). Continuing into the 1980s and 1990s, findings concerning living and working conditions for migrant and seasonal farm workers remained virtually unchanged (Trotter, 1988; Meister, 1991; Slesinger and Ofstead, 1993).

In 1989, Mickey Leland who was Chair of the U.S. House of Representatives Select Committee on Hunger, stated that migrant and seasonal farm workers lacked clean water, adequate food, decent shelter, sanitation, and that they worked in hazardous conditions (Shotland, 1989). In a statement before the House Select Committee on Aging in 1991, testimony given stated "The living and working conditions of many farmworkers in this country are substandard" (GAO, 1991, p. i). Migrant and seasonal farm workers remain the least protected members of the American work force and the most poorly paid (GAO 1992). Seasonal farm workers face many of the same work conditions and may suffer similar environmental conditions of water, food, housing, sanitation, and access to health care (Meister, 1991; Wilk, 1991). Legislation has been enacted to provide safe and healthy working and living environments but, enforcement of the law remains problematic (Wilk, 1991; National Advisory Council on Migrant Health, 1993).

Wage and Labor Legislation

The federal government organized the bracero program to import agricultural workers from Mexico between 1942 and 1964. The program was created by Public Law Number 82-78, 65 Statute 119 (1951) to meet the labor shortage caused by World War II (Goldfarb, 1981). Domestic workers would not do the backbreaking, low paid labor of farm work so, in order to get the work done, workers from Mexico were imported. One example of high paying domestic work was where janitors earned four times the amount of farm workers (Linder, 1992). Additionally, farm workers were excluded from unemployment insurance systems. "By the 1960s, the National Farmers Union opposed the bracero program on the ground that the low wages paid those workers by large farms lowered the price level for farm products and thus reduced the net earnings of farm operator families" (Linder, 1992, p. 26).

Even though the bracero program was terminated, Mexicans continue to come here to work both as certified foreign labor and as undocumented or illegal workers. Goldfarb (1981) points out that the "push-pull" principle is a work. "The push aspect is that most illegal aliens come from countries with high populations, a very poor economy, and historic links with the United States. The pull is that American farmers like to use foreign farm workers: they complain less, work hard, are tied to their employers because they lack mobility, are easy to exploit, and work for less money" (p. 121). An estimated 30 to 70% of Mexico's labor force is un- or underemployed. Workers often seek work across the border where wages may be six times higher than in Mexico (Young 1995). Workers from Mexico will endure bad conditions and low pay while many domestic workers will not work for the meager wages in back-breaking labor (Linder, 1992). Low payment for farm work continues today based on legislation passed in the 1930s.

The Fair Labor Standards Act (FLSA) of 1938 regulates working conditions and wages of workers, including children. (GAO, 1992) The Act establishes standards for

child labor, overtime pay, minimum wages, and record keeping. It is estimated that only about half of all migrant and seasonal farm workers are entitled to minimum wages because of exemptions to the Fair Labor Standards Act which include both adults and children. (Wilk and Hancock, 1991). The FLSA allows for seasonal workers who are paid by the piece and who have worked less than 13 weeks during the previous year to not be entitled to the minimum wage. "Piece rate" means that the rate of pay is calculated based on the number of pieces of the crop that is harvested (ORS 653.010). For example pay for picking radishes might be $1.25 for 157 pieces (radishes) picked.

Minimum wage is not required for workers employed as hand harvesters or pruning laborers in Oregon who are paid on a piece rate basis and who work less than 13 weeks during the preceding calendar year. Exemptions under Oregon law also include workers who commute daily from a permanent residence to the farm where they work, and those who hand harvest or prune on a piece rate business and who work for an employer who did not use more than 500 piece rate work days of farm labor (ORS 653.020). Minimum wage is not required for migrant hand-harvest workers sixteen years of age or younger who work on the same farm as their parents and who receive the "same piece rate as other employees older than 16 years of age working on the same farm" (Oregon Department of Agriculture, 1992). Farm workers on small farms or 62% of "nonsupervisory employees in agriculture" are not covered by minimum wage laws (Linder, 1992, p. 293).

Any agricultural employer who employs less than seven workers six days a week for 12 weeks in a three month period is exempt from paying minimum wage (Wilk and Hancock, 1991). Agricultural employers do not have to pay for overtime work. During peak season farmworkers often work in the fields dawn to dusk for six or seven days.

Thirty-eight states do not require worker's compensation for farmworkers as is required for all nonagricultural workers. In the states where worker's compensation is provided to farm workers, afflictions such as pesticide poisoning are commonly not covered (Meister, 1991). With few exceptions, Oregon requires employers to provide

workers compensation insurance that includes medical expense coverage. Seasonal workers are often unable to qualify for unemployment compensation because they meet time requirements to qualify for coverage (Wilk and Hancock, 1991).

Hand harvest laborers in Oregon are exempt from Social Security taxes if they work on a piece-rate basis. Hand harvest laborers are also exempt if they commute daily from their permanent residence and if they worked fewer than 13 weeks in agricultural labor during the previous calendar year. In other words, many seasonal workers may not have social security tax withheld from their wages.

The Immigration Reform and Control Act (IRCA) of 1986 legalized many undocumented workers, especially in agricultural work. The act was designed to reduce "unauthorized or illegal alien workers in the U.S. work force" by imposing sanctions on employers who hire unauthorized workers and by legalizing undocumented residents in the U.S. (Martin, 1993, p. 15). In effect, the act has not reduced illegal immigration into the United States and it has excluded some farm workers from programs including unemployment insurance benefits and workers compensation (Martin, 1993).

Workplace regulations are less stringent for children than they are for adults (Meister, 1991). In 1981 the Department of Labor estimated that about 400,000 children aged 8 to 15 worked in agriculture (Meister, 1991). Federal labor law and child labor regulations govern ages at which children are allowed to perform farm work. Children are permitted to work in agricultural work at younger ages than in other industrial work (GAO, 1992) Hazardous occupations such as mining and logging require children to be at least age 18. Sixteen year-olds involved in farm work are allowed to work with hay bailers, combines, or tractors. Children ages 14 through 16 are allowed to work in "non dangerous occupations," and parental consent is required for children younger than 14 to perform non hazardous farm work (GAO, 1992). Trotter (1988) points out that child labor laws are often ignored by growers and by migrants because "for growers, child labor keeps the cost

of harvesting low and for migrants, children doing piece work can make a significant contribution to daily and weekly family income" (p. 25).

Housing Legislation

Weak legislation and lack of enforcement impact on housing availability and quality of housing for migrant farm workers. Deplorable housing conditions in the past were often blamed on the lack of inspection and monitoring by agencies such as OSHA. Other agencies, such as the Department of Labor Wage and Hour Division, have assumed regulatory power over housing enforcing regulations and levying fines. Increased enforcement of housing standards has forced many labor camps to shut down which in effect exacerbates the housing problem. Almost 40 percent of the housing units in Colorado were shut down at the end of the 1990 growing season leaving nothing in place for workers in the future season (National Advisory Council on Migrant Health, 1993).

Much of the housing provided for migrant farm workers is substandard in spite of U.S. Department of Agriculture regulations which require: well-built houses with adequate space for the number of people living in the house (often several families in one house), access to safe water, adequate lighting, and proper ventilation (National Advisory Council on Migrant Health, 1993). Provision for garbage storage and disposal is often inadequate with evidence of mosquito breeding and the presence of rodents. Water and sanitation, basic requirements for prevention of communicable diseases, may be provided but may be unsafe or inadequate. Washing and toilet facilities may be found in living or cooking areas. Lack of water for bathing and laundry can facilitate the spread of disease as well as the contamination of the home environment by chemicals used in farm work.

Inspections of labor camps often reveal a lack of indoor water and bathroom facilities (Wilk and Hancock, 1991; Goldfarb, 1981). Where labor camps are unavailable, migrant workers attempt to find local housing which, when affordable, is also often substandard. Subsidies, such as Section 8 housing allowance, are not available to

migrant farm worker families because of their mobility and therefore, there is little assistance for finding a livable and affordable residence (National Advisory Council on Migrant Health, 1993). When alternative housing is not available many workers sleep in vehicles or in make-shift camps set up near the fields (National Advisory Council on Migrant Health, 1993). This location may increase exposure to agricultural chemicals and other hazards. Whether in the household or in the work site, farm workers are exposed to several risk factors which may impact on health.

Occupational Safety Legislation

Most labor laws do not cover farm workers because "agriculture is different" so workplace protection is not provided (Wilk and Hancock, 1991). Workplace health and safety regulations may or may not apply to farm workers, and may or may not be enforced. The Occupational Safety and Health Administration's (OSHA) Right to Know act is not being enforced for many farm workers because there is an unresolved conflict concerning jurisdiction over pesticides between OSHA and the Environmental Protection Agency (Wilk and Hancock, 1991). The Environmental Protection Agency (EPA) has primary jurisdiction over pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (40 CFR). Oregon law (ORS 654.760) requires employers to provide information to employees about hazardous chemicals in use in the workplace, to provide protective safety equipment and to train workers concerning mixing, loading and applying hazardous chemicals. Information is required to be provided in a variety of languages including Spanish, Russian, and English. In spite of the requirements of the law, recent testimony before the state Department of Environmental Quality indicated that working conditions vary from farm to farm. In many cases, workers will not complain because they fear reprisals from their employer (Linder, 1992).

A 1987 Occupational Safety and Health Act required farm field sanitation facilities including free drinking water, toilets and wash water. In 1989 the law was amended to

require that only farms where 10 or more workers in a one mile stretch would have to provide sanitation and water (GAO, 1992) Farms with fewer than 10 workers are exempt from the sanitation laws. Sixty-nine percent of farms subject to the laws were found in violation during inspections done in 1990 (GAO, 1992; National Advisory Council on Migrant Health, 1993).

Health Legislation

The Migrant Health Act, passed in 1962, was a grant program where monies were given to non-profit and public organizations to set up health clinics to improve the health of migrant workers. Future amendments added seasonal workers to the list of qualifying recipients. During the early 1960s and the War on Poverty many of the people in the neighborhoods where the war was to be fought were suffering from illnesses and diseases that would impact on their ability to be effective in neighborhood programs (National Association of Community Health Centers, Inc., 1993). In order to meet the needs of the poor, the Comprehensive Health Center Program was established in 1966 by an amendment to the Economic Opportunity Act (National Association of Community Health Centers, Inc., 1993). 547 Community and migrant health centers are funded under Title III of the Public Health Service Act. Congress appropriates funds which are administered by the Bureau of Health Care Delivery and Assistance of the Public Health Service.

Community and Migrant Health Centers (CMHCs) are required to provide primary care services, preventive health, case management, pharmacy, emergency care, transportation, and preventive dental care. Health education, social services, mental health, substance abuse, disease screening and control, and environmental health are supplemental services which centers may choose to provide (National Association of Community Health Centers, Inc., 1993). Medical care is provided to eligible persons based on income level and on whether or not they receive financial aid from Aid to Families with Dependent Children or the Supplemental Security Income (SSI) program. Only blind, disabled, or

aged are eligible for SSI while both programs assist persons with limited income and resources. Many farm workers are not eligible for Medicaid because they do not qualify for AFDC or SSI. A Department of Labor study in 1990 found that only 3 percent of farm worker households received AFDC benefits during 1988 to 1990 (GAO, 1992). State residency poses a barrier for many migrant farm workers who attempt to access the Medicaid program. A 1982 study conducted in New York found that less than 12% of migrant farm workers had Medicaid (GAO, 1991). Access to health care remains a problem in spite of legislation designed to alleviate the problem.

Health Status of Migrant and Seasonal Farm Workers

Migrant and seasonal farmworker (MSFW) health status is generally accepted as being lower than the national average based on anecdotal information and results from several studies done in the southeast, midwest, and southwest portions of the United States (Dever 1991; Meister 1991). "Much of the research on migrant farmworkers is seriously out of date, having been done in the 60s and 70s" (National Advisory Council on Migrant Health, 1993, p. 81). Galarneau (1992) pointed out that outdated and unsubstantiated health status information is continually circulated and presented as fact. Galarneau also discussed the fact that many studies of migrant farm workers has occurred in local and state settings and that the results of those studies are presented to represent the farm worker population at large.

Health Outcomes and Contributing Factors

Many earlier studies were done in the 1970s and compared migrant health status to the national averages for health which does not account for several factors that are specific to the lives of migrant farm workers. Most migrant farm workers are ethnic minorities. A comparison with the general population may not include the same composition of ethnic

minorities as is found in the migrant and seasonal farm worker populations. Migrant farm workers represent some of the poorest people in the paid labor force in the United States. Migrant farm workers earn an average of $6,000 a year (Martin, 1993; Meister, 1991; Goldsmith, 1989). Migrant and seasonal farm workers often have little to no formal schooling which prevents them from moving into more skilled jobs that are higher paying (Slesinger, 1993). Poverty, in combination with the living and working environment, may result in a health status for MSFWs similar to that found in less developed nations.

Three additional considerations might make migrant farm worker health unlike the general population. The first consideration involves ancestral origin. Several studies document that there is a predisposition for diabetes in people with a genetic admixture or blending of Mexican-Indian and Hispanic cultures (Urdaneta and Krehbiel, 1989; Chakraborty and Weiss, 1986). It is difficult to distinguish between environmental effects and genetic effects because migrant families tend to preserve some of their cultural practices including diet (Urdaneta and Krehbiel).

The second consideration is acculturation or "the process of culture change resulting from the contact between two cultures" (Rosman and Rubel, 1992, p. 331). Recent studies documented health or lifestyles that change after people become acculturated to the United States culture. For example, as Mexican women become more acculturated, the risk of giving birth to a low birthweight baby increases and there is a decrease in the amount of breast feeding (Council on Scientific Affairs, 1991). Alcohol consumption and tobacco use which are both ordinarily low or non existent in Mexican women may increase with acculturation in the U.S. (Council on Scientific Affairs, 1991). Hispanics who were more "acculturated" were found to use more health care services (Council on Scientific Affairs, 1991). Hall (1973) found that when weights and heights of Russian Old Believers were compared to American norms, Russian Old Believers were found to be heavier within comparable age groups. Old Believer diets relied on carbohydrates like potatoes and bread.

Another possible reason for the difference Hall discussed was that Old Believers tended to perform heavy manual labor unlike many of their American counterparts.

The third consideration is that migrant farm workers work in an environment that is hazardous. National safety council figures show that the agricultural industry accounts for a higher rate of disabling injuries than all seven other major industries, and ranks second to mining-quarrying in work-related death rates, accounting for over 14% of work-related deaths (Sakala, 1990; Rivara, 1990). Migrant and seasonal farm workers (MSFWs) who work in the nation's most dangerous occupation combine poverty with environmental exposures, in both the workplace and in substandard living conditions, for resultant rates of illness and injury that exceed national rates (Dever, 1991).

Occupational risks for migrant and seasonal workers can be broken down into several categories (National Advisory Council on Migrant Health, 1993). The first category involves exposure to natural elements: freezing temperatures, dust, rain, sun, pollen, natural allergens and toxins in fruits and vegetables. Many of these exposures can cause skin irritations, eye irritations, and respiratory irritations. The second category of risk involves exposure to impure water sources, infestations of insects or rodents, and improper disposal of sewage. In many cases time away from work will mean a loss in pay so workers do not seek safe water for drinking or for hand washing (Trotter, 1988). Sanitation, if it is available, may be a quarter of a mile away (Cole and Crawford, 1991). Men may use nearby bushes for a toilet, but women may not want to expose themselves and may delay relieving themselves for many hours which can contribute to urinary tract infections (Trotter, 1988). Workers might not drink water in order to prevent having to urinate which may lead to dehydration and heat exhaustion (Meister, 1991). A 1990 Department of Labor national survey found that 31% of migrant farmworkers worked in fields without toilets, drinking water, or hand washing facilities (GAO, 1992).

Hazardous and stressful work, the third category, includes exposure to farm equipment, stoop labor, ladders, monotony, and noise (National Advisory Council on

Migrant Health, 1993). This category is responsible for many of the farm labor related deaths (Wilk and Hancock, 1991).

A fourth category of risk consists of exposure to the wide range of chemicals that are used in agriculture. Pesticide use and misuse is a worldwide phenomenon and causes an estimated 10,000 to 400,000 diseases every year around the world (Baker and Gyawali, 1994). More than two billion pounds of pesticides are sold every year to U.S. farmers (Sakala, 1988). Migrant and seasonal farm workers are often exposed to fungicides, herbicides, rodenticides, insecticides, fumigants and other toxic pesticides as they work on tree fruits and row crops (Mentzer and Villalba, 1988). Common exposures occur by inhalation, skin absorption, ingestion, and eye contact (Cheremisinoff and King, 1994). Newer pesticides are extremely toxic and before dilution, only two or three drops on the skin can be fatal (Trotter, 1988).

Farm worker exposures often occur in various ways, including contact with direct spray or drift from application to ground crops; use of contaminated leaves as toilet paper; eating foods without washing hands or the food; smoking without washing hands; drinking or using contaminated water; wearing contaminated clothing; and laundering contaminated clothing with other people's clothing (Meister, 1991; Wilk, 1986). Many migrant and seasonal farm workers are not educated about the hazards of working with pesticides and often they are not provided with protective equipment (Wilk, 1986). In some cases even with protective equipment poisoning still occurred as was the case with mevinphos (Farmworker Justice Fund, Inc., 1994). Mevinphos, which was associated with the most farm worker poisonings in the United States, is no longer used in this country as of February 28, 1995. It can still be manufactured for export to other countries so some migrant farm workers who are home based in Mexico or other Latin American nations may still be working with mevinphos (Farmworker Justice Fund, Inc., 1994). Many migrant farm workers may not know they have been exposed to toxic chemicals.

Acute severe pesticide poisoning is rare (Coye, 1985). Low level exposures are more common but the lack of specific signs makes diagnosis difficult. Chronic health outcomes that have been linked to pesticide exposure include: anemia, adult lymphomas, lymphosarcomas, immune system abnormalities, children born with limb defects, child leukemia, child brain tumors, spontaneous abortion, menstrual dysfunction, anxiety, depression, and motor coordination problems (Meister, 1991). Signs and symptoms of pesticide poisoning may include dermatitis, eye irritation, upper respiratory distress, headache, nausea, tremors, blurred vision, lethargy, vomiting, and diarrhea (Cheremisinoff and King, 1994; Trotter, 1988).

The National Advisory Council on Migrant Health (1993) stated that many health status indicators for the health of migrant farm workers are unknown. Rust (1990) points out that few studies have been done comparing MSFW health status to a similar low income group. Additionally, he points out that prevalence of chronic diseases in migrant and seasonal workers has not been adequately studied. Rust also pointed out that most studies studied migrant and seasonal farm workers as one group which might not be appropriate since cultural, economic, social and environmental factors might vary between the groups.

Rust surveyed MEDLINE files from 1966 through October of 1989 and found "solid data" on dental health, nutrition, and selected data on childhood health, infectious diseases, pesticide exposures and skin conditions related to occupation, and children's lead levels. Out of 203 articles Rust found 7 that dealt with adult health status, 2 that dealt with cardiovascular disease, 14 that dealt with children's health status, 12 that dealt with cancer, and 18 that dealt with infectious diseases. Meister (1991) and Rust (1990) both called for documentation of migrant health status. The National Advisory Council on Migrant Health has also recommended research that is both population and practice based (1993).

The ten most common reported conditions by migrant workers during screening programs were tooth and gum problems, eye trouble, ear problems, sore throat, back pain,

cough, allergies, fever, diarrhea, cuts, rashes, headaches, backache, strong anger, nervousness, stomach pains, heart problems, and kidney problems (Trotter, 1988; Littlefield and Stout, 1987). Other common problems include intestinal parasitic infections, urinary tract infections, heat stress, under nutrition, dysentery, hepatitis B, typhoid fever, baby bottle tooth decay, diabetes, anemia, tuberculosis, elevated blood lead levels, pesticide related disorders, and respiratory ailments (Goldsmith, 1989; Watkins and others, 1990; Cole and Crawford, 1991). Major health problems commonly found in studies of migrant and seasonal farm workers included diabetes, cardiovascular disease, and asthma (Trotter, 1988). Problems that are often seen as uncommon in many clinics are found in migrant clinics including parasitic diseases (e.g. shigella, salmonella, schistosomiasis), yellow fever, dengue fever, encephalitis, and typhus (Trotter, 1988). AIDS is increasingly being found in migrant and seasonal farm workers (National Commission to Prevent Infant Mortality, 1993).

Dever (1991) found that the under 15 age group made up 30% of the patient visits in a midwest migrant stream population compared to 20% for patient visits in the U.S. Dever also disaggregated data to find the top three reasons for visits to the clinic for females were diabetes, pregnancy, and well child care; for males the top three reasons were well child care, otitis media, and diabetes. Sherraden and Wallace (1992) found the three most urgent problems identified by a community health center to be teen pregnancy, drug abuse, and infant mortality.

Prenatal care is often absent for pregnant women (Trotter, 1988). In a Colorado study, one third of the women who had ever been pregnant had at least one miscarriage or abortion (Littlefield and Stout, 1987). Research also reveals health problems that are seen at higher rates in Mexican-Americans than for the overall population. One example is Type II or non insulin dependent diabetes. Mexican-Americans have a 110 to 120 percent higher rate of diabetes than the non Hispanic Anglo population (NDIC Clearinghouse, 1993). "Mexican-Americans have higher death rates from diabetes and are more vulnerable to

some of the severe complications of diabetes than are non-Hispanics" (NDIC Clearinghouse, 1993, p. 1). Inactivity and obesity are linked to Type II diabetes and Mexican Americans are more likely than the general population to be obese (Olvera-Ezzel et al, 1994).

Many ailments can be attributed to mental stresses and strains of everyday life. Increasingly articles document family violence, substance abuse, and psychological problems in migrant and seasonal farm workers (Rust, 1990).

Many unanswered questions remain concerning the health of migrant and seasonal farm workers. Some of these involve prevalence of chronic diseases including hypertension and diabetes. It is not clear from information available what the immunization status is for children and adults. Perinatal outcome data (such as birthweight, prematurity, and infant mortality) is not available. Little is known concerning the prevalence of the use of home remedies (i.e. herbal teas) and interaction with prescribed drugs (Trotter, 1986).

Rust (1990) indicated that he found no articles during his literature review concerning otitis media and streptococcal pharyngitis in children which are the "most common infections in clinical practice" (p. 1216). Additionally, there were no articles concerning the most common causes of hospitalization among migrant farm workers which include pneumonia, appendicitis, cellulitis, and diabetic foot infections. In depth research of the migrant and seasonal farm worker population is made difficult by the very nature of the migrancy of much of the farm worker population (Meister, 1991; Trotter, 1988). Most studies in the past selected one disease or condition as opposed to developing a demographic overview of a clinic population with a comparison group of non farm workers (Rust, 1990). Virtually none of the health status indicators that are used to set policy and develop programs in this nation are available for the farmworker population (Galarneau, 1992).

Stresses of living conditions for migrant and seasonal workers include overcrowded living arrangements, uncertainty of work and income, hostility in communities, isolation, and language and cultural barriers (Trotter, 1988). Migrant farm workers may not feel that they are part of the larger community due their migratory lifestyle that prevents them from staying for any length of time in one place (Trotter, 1988). The poor, and migrant and seasonal farm workers in particular, may feel powerless or have a sense of a lack of control over their destiny which is a risk factor for disease (Rust, 1990; Wallerstein, 1992). Social isolation may affect health and health seeking behaviors (Chesney et al, 1982). Stresses cause tangible and intangible health conditions (Syme and Berkman, 1976; McGonagle and Kessler, 1990; Lillie-Blanton, Martinez, Taylor, and Robinson, 1993). Many of the social stressors may result in conflict, neglect, abuse, and violence as is seen in the general population as well as in migrant and seasonal farm workers (Cole and Crawford, 1991). Slesinger (1993) points out that "For migrant workers, persistent poverty may be the underlying problem most urgently requiring public attention" (p. 3). Economic and social poverty affects the health of the poor and particularly migrant and seasonal farm workers and their ability to get preventive and primary health care.

Access to Health Services and Barriers to Health Care

Migrant and seasonal farm workers face many additional barriers as they seek health care (Trotter, 1988). The most frequently named barriers to health care include income levels that are below the federal poverty line, language barriers, location of clinics, transportation to and from the clinics, availability of child care, times clinics are open, and immigration status (Lantz et al, 1994; Trotter, 1988; Meister, 1991). Lack of bicultural and bilingual providers also acts as a barrier to some cultural groups who might otherwise seek care (Krajewski-Jaime, 1991).

Another barrier to achieving good health is educational level. Children often do not get to attend school because they are needed in the field and because they migrate during the year (Slesinger, 1985; Slesinger, 1993; Trotter, 1988; Cole and Crawford, 1991). This has particular implications for the children who are in poverty and their hope for breaking out of an impoverished condition (Cole and Crawford, 1991).

Mobility from place to place puts migrant farm workers at additional risk for ill health. Continuity of care is made difficult by a migratory lifestyle (Trotter, 1988). Medicines may be over prescribed, chronic disease management may be disrupted, and immunizations may be given several times to the same client (Trotter, 1988).

Poverty is one of the leading reasons poor people are unable to access health care services. This is especially true for migrant and seasonal farm workers due to the nature of their work and wages. Migrant and seasonal farm workers and their dependents often get paid for the amount of time they work or by the number of pieces they pick. Therefore, missing work to go to the clinic affects how much money they earn. Many workers and their families do not have transportation or the ability to pay for transportation to get to the clinic. Another reason workers cite as a barrier that prevents them from preventive or primary care is that they don't have money to pay for the visit or for medications. In concert with these reasons is that child care is often unavailable for children to allow parents to take other children or themselves to the clinic.

Many hired farm workers may not receive federal health care assistance and full social security (GAO, 1992). Employers may not have reported all the earnings for farm workers which means that the workers will not receive the Social Security benefits to which they are entitled (GAO, 1992). States design and administer their own Medicaid programs. To be eligible for Medicaid in most states people must be citizens or nationals of the U.S. or must have satisfactory immigration status. If people qualify for Aid to Families with Dependent Children (AFDC) or for Social Security Insurance (SSI) they generally qualify for Medicaid. Many hired farm workers make too much money to qualify for cash

assistance under AFDC or SSI. Currently employed farm workers are also unlikely to qualify for SSI based on the program's definition of disability or blindness. "Labor's 1990 nationwide survey of migrant farmworkers found that only 3 percent of migrant farmworker households had received AFDC benefits during the past 2 years" (GAO, 1992, p. 24). Enrollment procedures and other administrative requirements act as barriers for migrant farm workers who qualify for Medicaid. Federal regulations allow a 45-day waiting period for Medicaid application processing. Many migrant farm workers may leave the area before the 45-day period. Health providers in one state may not accept out-of-state Medicaid cards so migrant farm workers who are qualified may not be able to get care. In Labor's 1990 survey, about four out of five migrant farm workers did not have employer-provided health insurance (GAO, 1992).

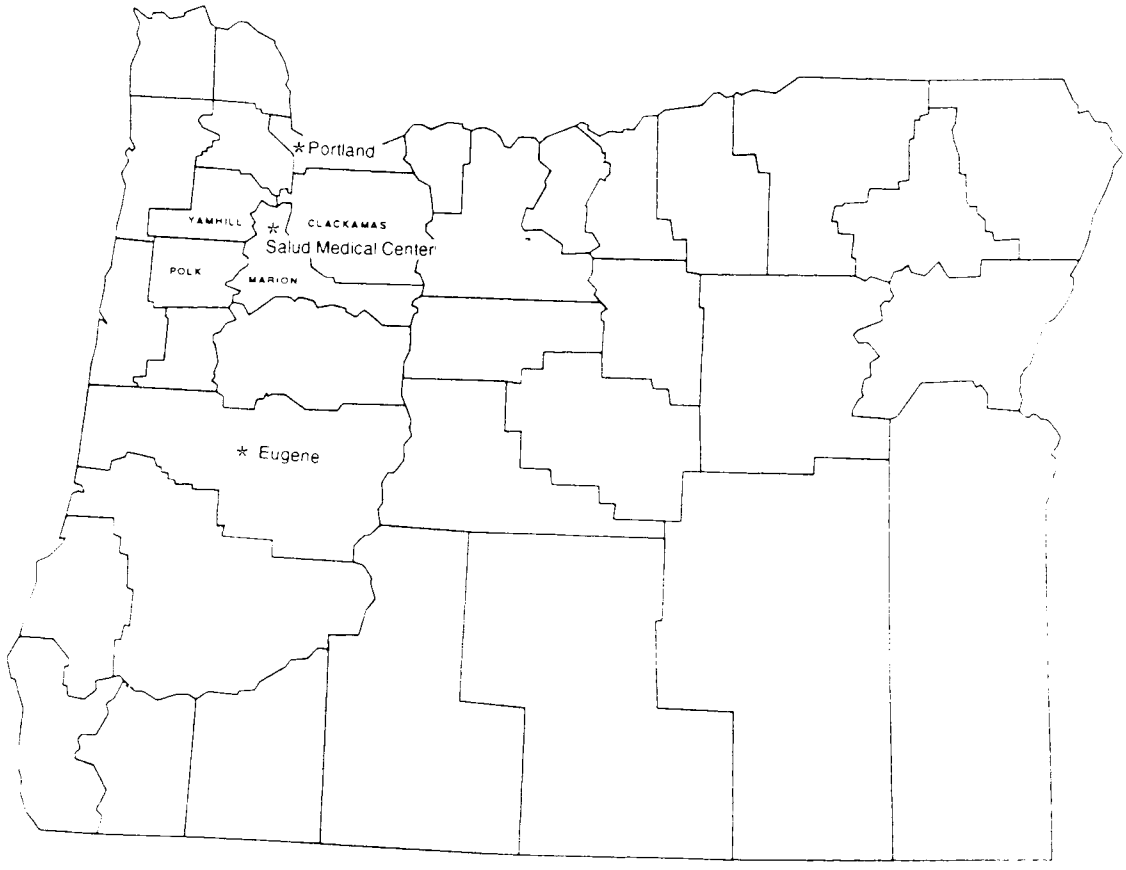
Local community and migrant health centers and outreach groups attempt to provide services to communities including hired farm workers. Some community-based programs are being used in an attempt to develop self-sufficiency. Many of the programs are participatory which, as Wallerstein and Bernstein (1992), Meister (1991), Werner (1982), and Gran (1983) point out, are prerequisites for sustainable change to occur in a community. Lay health workers using a family counseling approach are increasingly being used to augment clinic services. The center of the farm working family is the mother and great successes are being seen in training women as lay health educators (National Migrant Resource Program, Inc., 1993; Cole and Crawford, 1991; Watkins, Larson, Harlan, and Young, 1990). Empowerment of the community through training and education, especially of women, is key in improving health in the migrant and seasonal farm worker populations (National Advisory Council on Migrant Health, 1993). This model has been used successfully in poor communities throughout the world (Freire, 1985). Outreach programs are providing culturally appropriate mental health and substance abuse education for adolescents and farmworker women (National Advisory Council on Migrant Health, 1993; National Migrant Resource Program, Inc., 1993).

Poverty, powerlessness, exploitation, and marginalization of migrant and seasonal farm workers, as well as of poor people in the general population, have an impact on health status (Rust, 1990; Woelk, 1992; Linder, 1992; Texidor del Portillo, 1988). Community and Migrant Health Centers are successfully helping to bridge the gap between the larger society and the enclaves of poor to improve access to primary health care (Sherraden and Wallace, 1992).

Salud Medical Center and the Surrounding Service Area

The area that is primarily served by Salud Medical Center includes the four county area of Marion, Polk, Yamhill, and Clackamas counties. Table 2.2 depicts the four county area and location of Salud Medical Center.

Table 2.2 Location of Salud Medical Center and Primary Service Area



Oregon's second largest industry, after forestry, is agriculture and is found primarily in the Willamette Valley. The Willamette Valley extends from the mouth of the Willamette River in Portland in the northern end of the valley to the city of Eugene at the southern end. Seventy percent of the state's population lives in the valley. Forty-seven percent of all agricultural employment in Oregon is in the valley.

The population, median household income and percent of all families living the primary service area of the four counties that are served by the clinic are shown in Table 2.3 (Bureau of the Census, 1991). More than 622,425 people live in the four county service area. Marion County, which includes the state capital and many of the government offices had 9.4% of families with income below the poverty line. Marion County has about 43% of the total farm worker population in the Willamette Valley and is the site of Salud Medical Center, Inc. that provides health care to the poor, and migrant and seasonal farm workers who live in the surrounding areas (Northwest Regional Primary Care Association, 1989). Clackamas County includes many of the Portland suburbs.

Table 2.3 Median Income, Poverty, and Population in the Clinic's Service Area

County:	Median Household Income (1989 dollars)	Percent of all families with income below poverty line	Population:
Marion	26,876	9.4	228,483
Polk	26,292	8.4	49,541
Yamhill	28,303	8.5	65,551
Clackamas	35,419	4.7	278,850

According to the 1990 census, the town of Woodburn, where Salud Medical Center is located, had 15.2% of families with income below the poverty line. Many of the towns that are adjacent to the clinic in the heart of the agricultural area have a higher percent of

families in poverty than is indicated by county statistics which include statistics for the major cities and towns (Bureau of the Census, 1993). The towns shown in Table 2.4 are the areas where many of the seasonal farm workers live throughout the year. Migrant farm workers also live and work in many of these towns.

Table 2.4 Income and Percent of Families in Poverty for Towns Served by Clinic

Town:	Median Household Income (1989 dollars)	Percent of all families with income below poverty line
Amity	20,655	15.0
St. Paul	30,750	9.6
Silverton	22,644	10.3
Hubbard	24,564	10.1
Mt. Angel	24,241	11.7
Gervais	24,583	18.5
Woodburn	22,253	15.2

Community and Migrant Health Centers were established to provide access to health services in underserved areas for the poor and disadvantaged. Community and migrant health centers (CMHCs) function as non-profit businesses and are "owned" by the community through a governing board comprised of volunteer residents and leaders of the community where the center is located (National Association of Community Health Centers, 1993). Community and migrant health centers operate much like private medical practices in that they have physicians, nurses, dentists, and other health professionals. Additionally, they have a broad public health perspective and offer social services and health education. CMHCs operate within a community and provide employment, purchase goods, and have an economic impact within the community. Many of the providers live in the community so they are familiar with many of the local needs and issues and an

extensive network often develops to provide shelter, medications, legal assistance, and information.

Funding for CMHCs is provided by many sources. Insurance companies are billed on their clients behalf. Medicare and Medicaid clients are served in CMHCs. Patients without insurance pay their own bills. The Board and staff seek funding through local donations, foundation grants, and government funding. Title III of the Public Health Service Act (Public Law 97-35 as amended) provide funds for migrant health centers. Title V (Public Law 101-329 as amended) provides funds for maternal and child health. States control Title V funds so migrant health center staff must negotiate with the state concerning provision of services (Watkins et al, 1990).

In the early 1970s when funding began for Community and Migrant Health Centers, the obvious location for a clinic was the Willamette Valley. Migrant farm workers began to settle out into the area in the 1950s and 1960s. Additionally, there was an influx of Russian immigrants into the area. In 1964 the first group of Russian Old Believers arrived. Old Believers were and are part of a group that refused to adopt the Russian Orthodox church reforms of 1666. Many Old Believers sought religious freedom and traveled to the U.S. often via Brazil and Argentina where many learned to speak Spanish. Old Believers came from an agrarian heritage and many maintain that today. Many also maintain their traditional customs, ceremonies, and beliefs. Traditionally, Old Believers relied on herbal remedies, midwives, and faith to heal ailments. Consequently, they were often very sick when they sought medical attention. Old Believers traditionally had very large families and that continues today for many families. Culturally, Old Believers hold many beliefs and values concerning health care that are similar to traditional Mexican culture.

"The Spanish-Catholic tradition and Indian heritage produced a mixture of humoral and herbal medicine, which was then passed down from mother to daughter through successive generations" (Reinert, 1986, p. 26). Some of these traditional beliefs may be

adhered to or incorporated into Mexican-American culture today especially for minor health problems, psychosocial problems, and chronic problems that continue after visits to a physician (Reinert, 1986). Herbal remedies are often part of traditional health care. Poverty often prevented migrant farm workers from seeking health care until the situation warranted seeking the help of the medical community.

In 1972, the Valley Migrant League, funded by the Office of Economic Opportunity, started a clinic to provide a migrant outreach clinic. The site of the clinic was the McLaren School medical facility. Satellite outreach clinics were set up in nearby towns. In 1976 the clinic, under the name Centro de Salubridad, moved to Woodburn. In 1987 a new name that would reflect it's identity as a community and migrant health center was chosen and the clinic became Salud Medical Center, Inc.

In 1993 an earthquake forced the center to move to a temporary location in the Armory. Another move to another location in a vacated grocery store was accomplished in March 1994 and that is the location where this study was conducted.

Services offered by Community and Migrant Health Centers, as mentioned earlier, are dictated by law in terms of services that must be offered. Salud Medical Center offers services that include medical care (family health care, maternity and well woman care, health education, immunizations, well child and adolescent care, family planning, and in patient medical care through Silverton and Salem hospitals), maternity services, lab services, x-rays, dental care, limited dispensary of medications, and women and infant children programs. There are also aggressive diabetes and lead screening programs. Outreach programs provide education, transportation, and training.

Clients who visit Salud Medical Center include Mexican Americans, Russian-speaking people, Anglos, Mexicans, and Central Americans. The daily average number of patients seen in SMC is 125. In 1992, the number of patient visits was 35,671 which was up 20% from the previous year. The number of patients seen was 12,677 which included medical, dental, outreach, and WIC clients.

The user population of SMC (as defined by SMC) is mostly comprised of Hispanics (79%), Anglos and other ethnic groups (13%), and Russians (6%). Approximately 63% of the patient population is comprised of migrant and seasonal farm workers. Salud Medical Center operates on a fee-for-service basis charging fees based on family income and size and, accepts all insurance. Seventy-four percent of the clinic clients are below the federal poverty level. Salud Medical Center is the only tri-lingual and tri-cultural center in the area.

Cultural beliefs influence health seeking behavior (Reinert, 1986). Anglos may favor the biomedical model and high technology while other cultural groups, such as Mexicans or Mexican-Americans, and Russian Old Believers, may rely on traditional birth attendants and herbal remedies (Reinert, 1986; Martaus, 1986; Baer and Bustillo, 1993; Krajewski-Jaime, 1991). Several programs at the clinic are culturally sensitive and appropriate for these beliefs and practices. Lay health educators are used to reach more clients, to perform screening in migrant camps, and in general, to promote family health (Larson et al, 1992; Meister, 1992). Additionally, there are outreach visits to the migrant camps where workers are screened after work hours for hypertension and anemia. Educational sessions are conducted on pesticides, nutrition, hygiene, anemia, diabetes, substance abuse, tuberculosis, AIDS, and sexually transmitted diseases (personal communication with the SMC Health Educator, 1993). Outreach provides services that might otherwise be unavailable and may increase self-sufficiency by providing empowering education to household members (National Advisory Council on Migrant Health, 1993).

CHAPTER III

METHODS AND PROCEDURES

This chapter describes the research design and procedures followed in selection of the sample of medical charts from a community and migrant health center, of abstraction of the medical records and recording of data, and of data analysis.

Research Design and Study Sample

This descriptive study involving abstraction of information from medical records for 1993 was conducted at Salud Medical Center, Inc. Salud was a federally designated Community and Migrant Health Center located in the town of Woodburn, in Marion County, Oregon. Permission to perform this study was obtained from the Executive Director of Salud Medical Center following submission of a proposal that outlined the research goals, procedures, and outcomes. Following approval by the Executive Director, Oregon State University's Committee for the Protection of Human Subjects approved the project.

A meeting was setup with the Executive Director, Outreach Coordinator, and Medical Records Supervisor to establish a secure space for confidential records review, to establish procedures for pulling individual records and for returning records following completion of individual record review. The Medical Records Supervisor briefed the Medical Records staff concerning the research so they were ready to assist in record retrieval if necessary. Content and layout of the medical record or chart for individuals was explained to the researcher by the Medical Records Supervisor. Following this meeting, a preliminary review of a sample of 10 records was done to determine the type of information and format that was available in the medical records. A spreadsheet was set up for data entry based on the format of the medical records to make data entry more effective.

Medical record entries followed an established format. As appropriate for sex or age, the records contained information about household income, cultural identity, referrals to specialists, emergency room reports, lab results, immunizations, certified nurse midwife reports, and information about each visit made to the clinic. All clients were determined by self-report during their first visit to the clinic (not necessarily during 1993) to be Hispanic, Russian, or Anglo and that information was recorded in the chart and designated by H, R, or K. Additionally, all clients had to indicate their source of payment (e.g. Medicare, Medicaid, private insurance, self pay). Household income was recorded (not necessarily during 1993) and often was documented by a copy of the most recent pay stub. Income information was recorded in the chart although, in many cases, it was incomplete or not up to date. Records for children included the household income for their household as reported by whomever brought them into the clinic.

When clients came to the clinic, staff recorded information regarding the reason that the client came to the clinic into the client's medical chart, or if it was a first visit to the clinic, on a form which was the first page of a new medical record. Forms consisted of lined pieces of paper. The date of the visit was recorded by the receptionist along with the reason the client gave for visiting the clinic (e.g. follow-up for suture removal, sore throat, results of pregnancy test, prescription refill, etc.). The client then was seen by a provider.

The provider recorded information about the examination of the client onto the form including information such as height, weight, blood pressure, temperature, symptoms, and other information pertinent to the client's condition. Standard format (as dictated by the clinic) for recording each visit to the clinic included the reason the person came to the clinic (e.g. sore throat), results of examination (e.g. red inflammation of tissues), assessment of the situation (e.g. culture taken and sent to lab), and a plan of action (e.g. antibiotic prescribed and follow-up appointment set).

Clinic and provider preferences dictated which measurements were taken or which lab specimens were drawn. If patients were in distress, height, weight, and blood pressure

or pulse rate may have not been recorded. In cases where infants or children were crying, fussing, or screaming, the provider noted that situation in the chart where it might have affected the measurement. Weights and heights were often recorded in cases when clients came in for a problem where they were not feeling well (e.g. gastrointestinal pain, lesions, chest pain, sore throat, etc.) or where they came in for follow-up of a specific disease (e.g. hypertension, diabetes, etc.). It was not uncommon to find a weight measurement without a height measurement for older (beyond the age of 30) clients. When clients came in for refills of medicine, weight, height and blood pressure or pulse rate measurements may or may not have been recorded for that visit. Weight was consistently recorded for most pregnant women who regularly were seen in the clinic. Blood pressure or pulse rate may or may not have been recorded for every visit. Infants and children had pulse rates recorded if their arms were too small for the cuff necessary to measure blood pressure. Specific lab tests were ordered when the provider determined it was appropriate including tests of glucose, blood lead levels, hemoglobin, cholesterol and triglycerides. Other lab tests ordered included, among other things, tests for: pregnancy, human immunodeficiency virus, sexually transmitted diseases, cancer, and parasites.

Lists of medical chart numbers grouped by occupation (as migrant farm workers, seasonal farm workers, and other clients) and grouped by sex (as female and male) for a total of six sets of chart numbers were provided by the Community and Migrant Health Center staff. Medical Center personnel determined the occupational status of a client according to the code in their chart (M, S, O). Children and other dependents received the classification of their parents or guardians. Women who did not work for pay outside the home received the classification of their domestic partner or husband.

Chart numbers represented clients who were seen as medical clients (in contrast to dental clients) during 1993. Each chart number (e.g. 01-48-93) was recorded on the chart and was retained on that chart over the years as the client visits the clinic. Charts were filed by chart number on shelves in the records section of the clinic. The chart number was an

identification number that allowed tracking through the system as an alternate to a name which may change over time (i.e. with legal name change or marriage). For this study, charts were pulled by chart number and a place holder with the name of the person who pulled the chart and the date was placed in the place of the chart. When review of the chart was complete, the medical record was returned to a designated area in the records section for staff to reshelve.

Clients of the Center came from a socio-economically diverse community including Russian-speakers, Spanish-speakers, and English-speakers. Income levels primarily ranged from near poverty to well below the federal poverty line. The selected Community and Migrant Health Center was a comprehensive health care center which was the only primary care center in the study area with Spanish and Russian speaking staff. During 1993, 85.2% of the clinic users were Hispanic, 4.8% were Russian, and 10% were Anglo. About 60% of the clients were migrant or seasonal farm workers working in labor intensive crops like cherries, berries, cauliflower, peas, bean, or corn. Additionally, many of the farm workers worked in nurseries, tree farms, and canneries. More than 74% of the user population was below the federal poverty income level and about 66% did not have third party coverage. An estimated 61% of clients were between the ages of 15 and 44. Female users comprised 46% of the clinic population.

A total of 4,775 chart numbers were provided by the health center staff. The listings represented clients seen for medical care in the clinic during 1993. Charts for females accounted for 56.5% of the total number of charts or a total of 2,697 charts. Charts for migrant farm workers totaled 1,708 or 35.7% of the total number of charts compared to 1,060 (22.19%) for charts for seasonal farm workers, and 2,007 (42.03%) for charts of clients who were not migrant or seasonal farm workers.

A random sample of medical chart numbers was selected using random tables (Kachigan, 1991). Using the clinic provided lists of chart numbers which were stratified by sex and occupation, chart numbers were selected to ensure selection of 100 charts for

females in each occupation group and 100 charts for males in each occupation group for a total of 600 charts.

Data Collection

In coordination with medical records personnel, charts were pulled for each selected client. In the event a chart was not available and could not be found by records personnel, alternate charts were chosen using random numbers tables. Charts were examined for the year 1993 and data abstracted onto a chart abstraction form in an Excel spreadsheet which was developed for this study. Data were entered directly into the spreadsheet using an identification number to represent each client's medical chart. Variables for this study were selected, based on the preliminary review of a sample of the medical records, and were listed as column headings and data were recorded by client for each variable.

Demographic variables included age, ethnicity, household income, and number of visits to the clinic. Age was recorded in years and percent of years (i.e. 2.75 for a child who was two years and nine months of age). Ethnicity was indicated by a categorical designator (H, K, R). Household income was recorded in dollars, and number of visits to the clinic was recorded as a number representing the total number of visits the client made during 1993.

Physiologic and biochemical measurements were recorded for each client when that information was available in the chart. Three physiologic and biochemical measurements were recorded when possible and an average of the three measurements calculated as an additional variable. Physiologic measurements were recorded in pounds for weight, inches for height, pulse rate (for infants and children), and systolic and diastolic blood pressure as recorded by the provider in the medical chart. Pounds and inches were converted to kilograms and centimeters to determine body mass index as a variable. Biochemical measurements were recorded in the unit of measurement recorded in the lab records found in the medical chart.

Disease and injury were recorded as dichotomous variables (1 as indicating the presence of the disease or injury) when diagnosed by the provider or as indicated in the medical record as a reason for a follow-up visit. In cases where a specific lab test was performed to determine the presence of a disease (i.e. fasting glucose as an indicator of diabetes), the dichotomous variable 0 was recorded for absence of the disease and 1 was recorded for presence of the disease. When clients were diagnosed with a disease or injury (i.e. otitis media, bronchitis, pneumonia, angina, laceration, etc.) the dichotomous variable 1 was recorded for that variable. Some diagnoses occurred prior to 1993 and the client returned for follow-up or maintenance which was recorded as a dichotomous variable 1 for those diagnoses. Data collection began in March, 1994 and ended in July, 1994.

Data Analysis

Data analysis, including hypothesis testing, was accomplished after importing data from the spreadsheet into statistical programs using StatView (Abacus Concepts, 1992) and Systat for the Macintosh (Systat, Inc., 1992). Data were classified and summarized using frequency distributions, measures of central tendency (mean and median), and measures of dispersion (range and standard deviation). Measures of association between variables were examined using scattergrams, correlations, contingency tables, chi-square, and analysis of variance (ANOVA). Analysis of variance was used to determine if differences existed between three means. When ANOVA yielded a significant F value, post-hoc tests (Scheffé, or Fisher's when cell sizes were equal) were used to compare multiple means to determine where differences were found. Hypotheses were tested using chi-square, and ANOVA. Odds ratios for presence or absence of disease were obtained using logistic regression. A significance level of a=.05 was used for all testing.

CHAPTER IV

RESULTS

Prevalence of disease was determined by examination of 600 medical records of a randomly selected clients at a community and migrant health center. Data entered from January 1 through December 31, 1993 were abstracted from medical records for clients who were migrant farm workers, seasonal farm workers, and other clients who were not migrant or seasonal farm workers. Data were analyzed to determine the demographic profile of the clinic population, and to determine differences between selected groups for variables. This chapter will discuss a general overview of demographic information concerning the study sample and, the results of statistical analyses.

Characteristics of Study Sample

Medical records for clients who were migrant farm workers, seasonal farm workers, and other clients who were neither migrant nor seasonal farm workers were randomly selected from three listings supplied by the clinic to provide 200 records for each occupational group as shown in Table 4.1. Children were categorized by medical center staff according to the occupation of their parent or guardian and children are included in the analysis as members of their parent's or guardian's occupational group.

One hundred females and one hundred males were randomly selected from each of the client groups of migrant farm worker, seasonal farm worker, and those who were not migrant and seasonal farm workers (not MSFWs). Overall, Hispanics comprised 85.17% of the sample, 4.83% were Russian, and 10.00% were Anglo. Ninety-nine percent of migrant farm worker clients were Hispanic and more than 97% of seasonal farm worker clients were of Hispanic culture. Fifty-nine percent of clients who were not migrant and seasonal farm workers were Hispanic. Russian speaking people made up less than one percent of the seasonal farm worker group and a little more than 12 percent of the not

MSFWs group. Anglos comprised one and a half percent of seasonal farm workers and 28.5% of clients who were not MSFWs. No Anglos were found to be migrant farm workers.

Table 4.1. Distribution of Clients for Sex and Culture by Occupational Groups

	Total No.	Migrant Farm Worker		Seasonal Farm Worker		Not MSFW	
	n	n	(%)	n	(%)	n	(%)
Sex:							
Female	300	100	(50)	100	(50)	100	(50)
Male	300	100	(50)	100	(50)	100	(50)
Total	600	200	(100)	200	(100)	200	(100)
Culture:							
Hispanic	511	198	(99.0)	195	(97.5)	118	(59.0)
Russian	29	2	(1.0)	2	(1.0)	25	(12.5)
Anglo	60	0	(0.0)	3	(1.5)	57	(28.5)
Total	600	200	(100)	200	(100)	200	(100)

Table 4.2 indicates the distribution of females and males by culture. Eighty seven percent of females were from Hispanic culture and 83% of males were Hispanic. Fifteen females (5%) were from Russian culture compared to 14 males (4.7%). Anglo females totaled 23 (7.7%) compared to 37 males (12.3%). Large variations by culture made analyses by culture difficult.

Table 4.2. Distribution of Females and Males by Culture

	Hispanic		Russian		Anglo	
	n	(%)	n	(%)	n	(%)
Female	262	87.3	15	5.0	23	7.7
Male	249	83.0	14	4.7	37	12.3
Total	511		29		60	

More clients were found in the 20 through 29 age group than in other age groups (Table 4.3). About 16% in each occupational group were found to be in the 30 through 39 age group. More than twice as many migrant farm workers (10.5%) were found in the birth to one year age group compared to the seasonal farm workers (4.5%) and to clients who were not migrant or seasonal farm workers (5.0%). In the 50 through 69 year age group nearly twice as many clients who were not MSFWs were found in this age group (10.5%) compared to migrant farm workers (4.0%) and to seasonal farm workers (6.0%).

The largest differences in ages between occupational groups were in the very young ages and in the older ages. More than twice as many migrant farm worker infants were seen in the clinic compared to each of the other two occupational groups. More than twice as many clients over the age of 50 who were not migrant or seasonal farm workers visited the clinic during 1993 as did clients who were migrant farm workers or seasonal farm workers.

Table 4.3. Occupational Distribution by Age

	Total No.	Migrant Farm Worker		Seasonal Farm Worker		Not MSFW	
	n	n	(%)	n	(%)	n	(%)
Age Groupings:							
Birth to 1 year	40	21	(10.5)	9	(4.5)	10	(5.0)
1 - 5 years	111	31	(15.5)	43	(21.5)	37	(18.5)
6 - 12 years	55	18	(9.0)	17	(8.5)	20	(10.0)
13 - 19 years	46	15	(7.5)	15	(7.5)	16	(8.0)
20 - 29 years	161	57	(28.5)	60	(30.0)	44	(22.0)
30 - 39 years	97	32	(16.0)	33	(16.5)	32	(16.0)
40 - 49 years	41	16	(8.0)	11	(5.5)	14	(7.0)
50 - 69 years	41	8	(4.0)	12	(6.0)	21	(10.5)
70 - 84 years	8	2	(1.0)	0	(0.0)	6	(3.0)
Total	600	200	(100)	200	(100)	200	(100)

Household income level was available in medical charts for 443 clients. More clients (n=164) listed household income in the $5000 to $8999 level than in other income

Household income level was available in medical charts for 443 clients. More clients (n=164) listed household income in the $5000 to $8999 level than in other income levels. More than 40% of migrant farm workers and not MSFWs listed household income as between $5,000 to $8,999 compared to 28% for seasonal farm workers who fell within the same income range. The second highest household income level listed by clients was the $9000 through $12,999 level. Fifty-nine (39.3%) seasonal farm worker households had incomes between $9,000 and $12,999 compared to 39 (26.5%) clients who were not MSFWs with incomes in the same range. Thirty-three (22.6%) migrant farm workers had household incomes between $9,000 and $12,999.

Table 4.4. Occupational Distribution by Household Income

	Total No.	Migrant Farm Worker		Seasonal Farm Worker		Not MSFW	
Household Income:	n	n	(%)	n	(%)	n	(%)
1000 - 4999	4	1	(0.7)	0	(0.0)	3	(2.0)
5000 - 8999	164	59	(40.4)	42	(28.0)	63	(42.8)
9000 - 12999	131	33	(22.6)	59	(39.3)	39	(26.5)
13000 - 16999	94	34	(23.3)	34	(22.7)	26	(17.7)
17000 - 20999	39	17	(11.6)	10	(6.7)	12	(8.2)
21000 - 24999	8	2	(1.4)	4	(2.7)	2	(1.4)
25000 - 29000	3	0	(0.0)	1	(0.6)	2	(1.4)
Total	443	146	(100)	150	(100)	147	(100)

A total of 2,284 visits to the clinic were made by the sample of clients during 1993. A slightly higher number of visits were made by migrant farm workers (803) compared to visits by not MSFWs (797), and by seasonal farm workers (684).

Table 4.5. Occupational Distribution of Number of Visits to the Clinic in 1993

	Total No.	Migrant Farm Worker		Seasonal Farm Worker		Not MSFW	
	n	n	(%)	n	(%)	n	(%)
Number of Visits	2,284	803	(35.2)	684	(29.9)	797	(34.9)

Hypothesis One

There will be no significant differences in demographic variables between migrant farm workers, seasonal farm workers, and clients who are not migrant or seasonal farm workers. Demographic variables include age, household income, and number of visits to the clinic.

Mean ages for occupational groups are shown in Table 4.6. There were no significant differences in mean ages between the three occupational groups (ANOVA). Clients who were not migrant or seasonal farm workers tended to be slightly older with a mean age of 24.61 years.

Table 4.6. Differences in Ages (in years) between Occupational Groups

	Migrant Farm Worker (n=200)	Seasonal Farm Worker (n=200)	Not MSFW (n=200)	F ratio
Mean age	21.38	21.26	24.61	2.4
SD	16.46	15.89	19.59	

When data regarding age were disaggregated by selected age groupings based on stages in life (i.e. infancy, childhood, adolescent, etc.) there was no

significant difference in mean ages between occupation groups (ANOVA). The distribution for each occupational group was similar across the age groupings.

Table 4.7. Differences in Selected Ages (in years) between Occupational Groups

	Migrant Farm Worker		Seasonal Farm Worker		Not MSFW		
	n	Mean age	n	Mean age	n	Mean age	F ratio
Age Groupings:							
Birth to 1 year	21	0.54	9	0.56	10	0.54	1.28
1 - 5 years	31	2.36	43	2.91	37	2.60	1.78
6 - 12 years	18	8.44	17	8.23	20	8.10	0.12
13 - 19 years	15	17.73	15	17.26	16	16.75	1.13
20 - 29 years	57	24.47	60	24.15	44	24.22	0.24
30 - 39 years	32	17.73	33	17.26	32	16.75	0.48
40 - 49 years	16	42.81	11	43.09	14	44.14	0.80
50 - 69 years	8	58.12	12	58.83	21	57.04	0.54
70 - 84 years	2	75.00	0		6	75.16	1.94
Total	200		200		200		

A quarter of the sample fell within the age group of birth through age 5. A little more than a quarter of the sample (26.8%) fell within the age group of 20 through 29 years of age. Only 8.2% were over the age of 50. More migrant farm worker infants visited the clinic than infants in the other two groups. Less clients who were not MSFWs and ages 20 to 29 visited the clinic than in the other two groups. More clients who were not MSFWs and over the age of 50 visited the clinic than in the other two groups.

When data were disaggregated by sex, significant differences in age were found between females in occupational groups (ANOVA) as shown in Table 4.8. The mean age for clients who were not MSFWs was 27.42 and the mean age for female migrant farm workers was 18.95 years. The difference between females who were migrant farm workers and females who were not migrant or seasonal farm workers was highly

significant (Fisher's PLSD p < .0004). Differences in mean age for females who were seasonal farm workers and females who were not migrant or seasonal farm workers was also highly significant (Fisher's PLSD < .0030). Females who were not migrant or seasonal farm workers tended to be older than the other two occupational groups. Mean ages for males were not significantly different. More variance in age was found in the clients who were not MSFWs for both females and males.

Table 4.8. Female and Male Age (in years) Differences between Occupations

	Females (n=300)				Males (n=300)			
	MFW	SFW	NOT MSFW	F-ratio	MFW	SFW	NOT MSFW	F-ratio
Mean age	18.95[a]	20.35[b]	27.42[a,b]	7.42	23.81	22.17	21.85	.343
SD	14.74	15.16	19.46		17.77	16.61	19.43	

[a] Significant difference p < .0004
[b] Significant difference p < .0030

Household income (in dollars) was not significantly different between occupational groups (ANOVA). Seasonal farm workers reported slightly more income that the other two occupational groups with a mean household income of $12,101.95 (Table 4.9).

Table 4.9 Differences in Mean Household Income (in dollars) between Occupations

	Migrant Farm Worker (n=146)	Seasonal Farm Worker (n=150)	Not MSFW (n=147)	F-ratio
Mean	11509.53	12101.95	11058.12	.0977
SD	4205.77	3812.07	4482.82	

Mean number of visits to the clinic were determined for occupational groups (Table 4.10). No significant differences were found in the mean number of visits to the clinic between occupational groups (ANOVA). Migrant farm workers had a slightly higher mean number of visits to the clinic with 4.02 compared to 3.99 for clients who were not MSFWs. The range of number of visits to the clinic per client ranged from one visit to 23 visits.

Table 4.10 Difference in Mean Number of Visits to the Clinic between Occupations

	Migrant Farm Worker (n=200)	Seasonal Farm Worker (n=200)	Not MSFW (n=200)	F-ratio
Mean	4.02	3.42	3.99	1.73
SD	3.78	3.22	3.78	

When the data were disaggregated by sex, there was a highly significant difference in the mean number of visits made to the clinic (t-test, two-tail p value < .0001). On average, female clients made more visits to the clinic than did male clients.

Table 4.11 Difference in Mean Number of Visits between Females and Males

	Females (n=300)	Males (n=300)	t-value
No. of visits	1330	954	
Mean	4.43*	3.18*	4.316
SD	3.75	3.36	

* Significant difference < .0001

When the data were disaggregated for each occupation by sex, the ANOVA revealed no significant difference in the average number of visits to the clinic for females between occupational groups. Female migrant farm workers had the highest mean number of visits with 4.86 visits compared to 4.47 visits for female clients who were not MSFWs. No difference was found in mean number of visits for males between occupational groups. Males who were not MSFWs had slightly more visits than males in the other two occupational groups. When income, gender, age, and occupation were regressed on number of visits, only gender was statistically significant (Multiple regression, p .0007).

Table 4.12 Differences in Female and Male Mean Number of Visits between Occupations

	Females				Males			
	MFW	SFW	NOT MSFW	F-ratio	MFW	SFW	NOT MSFW	F-ratio
Mean	4.86	3.97	4.47	1.42	3.17	2.87	3.50	.881
SD	4.01	3.60	3.59		3.34	2.71	3.91	
Median	4.00	3.00	4.00		2.00	2.00	2.00	

Hypothesis Two

> There will be no significant differences in physiologic measurements between migrant farm workers, seasonal farm workers, or clients who are not migrant or seasonal farm workers. Physiologic measurements include weight and height as body mass index, systolic blood pressure, and diastolic blood pressure.

Body mass index (BMI) was calculated by dividing weight (kg) by height (m^2). Results of ANOVA (Table 4.14) revealed that a highly significant difference in BMI existed between occupations for females ($p < .0045$). Scheffé tests revealed a significant

difference in the BMI for female migrant farm workers and females who were not migrant or seasonal farm workers ($p < .0147$). A significant difference also was found between females who were seasonal farm workers and females who were not migrant or seasonal farm workers ($p < .0243$). On average, clients who were not migrant or seasonal farm workers were taller by nearly four inches and heavier by an average of about 12 to 15 pounds than migrant farm workers and seasonal farm workers.

Cultural differences existed for weight and height. Analyses were not done by occupation since only 7 Anglos and Russians were found in migrant and seasonal farm worker occupations. Anglos were on average seven inches taller than Hispanics and Russians. The mean weight for Anglos was 146.4 pounds compared to 101.3 pounds for Russians, and 107.6 pounds for Hispanics. Therefore, there was a significant difference in body mass index between Hispanics and Anglos (Scheffé, $p \leq .0064$) and between Russians and Anglos (Scheffé, $p \leq .0167$).

Table 4.13 Difference in Body Mass Index for Females and Males between Occupations

	Females				Males			
	MFW (n=70)	SFW (n=69)	NOT MSFW (n=81)	F-ratio	MFW (n=84)	SFW (n=80)	NOT MSFW (n=85)	F-ratio
Mean	22.43[a]	22.64[b]	26.05[a,b]	5.54	23.01	22.25	22.21	0.463
SD	7.57	6.81	8.134		6.01	5.60	6.45	
Median	21.49	21.05	24.93		23.59	22.49	21.79	

[a] Significant difference $p < .0147$
b Significant difference $p < .0243$

Analysis of variance revealed a significant difference in mean systolic blood pressure (mm Hg) between occupational groups ($p < .0114$). Systolic blood pressure for migrant farm workers were significantly different from clients who

were not MSFWs (Scheffé, $p < .0212$). Systolic blood pressure for seasonal farm workers differed significantly from the pressure in clients who were not MSFWs (Scheffé, $p < .0052$). Clients who were not migrant or seasonal workers tended to have a higher systolic blood pressure than the other two occupational groups.

Table 4.14 Difference in Mean Systolic blood pressure (mm Hg) between Occupations

	Migrant (n=121)	Seasonal (n=127)	Not MSFW (n=128)	F-ratio
Mean	115.256[a]	114.205[b]	120.516[a,b]	4.52
SD	14.774	17.737	20.618	
Median	112.00	110.00	120.00	

[a] Significant difference $p < .0212$
[b] Significant difference $p < .0052$

Systolic blood pressure was analyzed by sex. Scheffé tests revealed a significant difference in mean systolic blood pressure between female migrant farm workers and females who were not migrant or seasonal farm workers ($p < .0200$). No significant differences in mean systolic blood pressure were found between males by occupation.

Table 4.15 Difference in Female and Male Mean Systolic Blood Pressure (mm Hg) between Occupations

	Female				Male		
	Migrant (n=54)	Seasonal (n=58)	Not MSFWs (n=72)	Statistic	Migrant (n=67)	Seasonal (n=69)	Not MSFWs (n=56)
Mean	109.20*	109.56	118.36*	Mean	120.13	118.10	123.28
SD	13.43	15.55	22.67	SD	14.06	18.61	17.44

*Significant difference $p < .0200$

A significant difference was found in mean diastolic blood pressure between occupational groups (ANOVA, $p < .0154$). A significant difference was found between mean diastolic blood pressure for migrant farm workers and clients who were not MSFWs (Scheffé $p < .0327$). Clients who were not migrant or seasonal farm workers tended to have higher diastolic blood pressure (mm Hg) than the other two occupational groups.

Table 4.16 Difference in Diastolic Blood Pressure (mm Hg) between Occupations

	MFW (n=121)	SFW (n=127)	Not MSFW (n=128)	F-ratio
Mean	72.017[a]	72.465[b]	76.172[a,b]	4.221
SD	11.241	12.222	13.763	
Median	72.000	70.000	77.500	

[a] Significant difference $p < .0090$
[b] Significant difference $p < .0182$

A statistically significant difference in mean diastolic pressure was found between females by occupational groups (ANOVA, $p < .0082$) as shown in Table 4.17. The difference in means between female migrant farm workers and female clients who were not MSFWs was significant (Scheffé $p < .0124$). Females who were not migrant or seasonal farm workers had slightly higher mean diastolic blood pressure of 75.333 mm Hg compared to the other two occupational groups. No significant differences in mean diastolic pressure was found between males by occupation.

Table 4.17 Difference in Female and Male Diastolic Pressure (mm Hg) between Occupations

	Female				Male		
	MFW (n=54)	SFW (n=58)	Not MSFW (n=72)		MFW (n=67)	SFW (n=69)	Not MSFW (n=56)
Mean	68.685*	70.655	75.333*	Mean	74.701	73.986	77.250
SD	10.479	11.168	14.302	SD	11.188	12.927	13.086

*Significant difference $p < .0124$

Hypothesis Three

There will be no significant differences in biochemical measurements for migrant farm workers, seasonal farm workers, or clients who are not migrant or seasonal farm workers. Biochemical measurements include blood lead levels, cholesterol, triglycerides, high density lipoproteins, low density lipoproteins, glucose, and hemoglobin.

Children were screened for blood lead levels. Mean blood lead levels between occupation groups were not statistically significantly different. The highest mean blood lead level was 4.056 µg/dL in seasonal farm worker children while the lowest mean blood lead level was 2.364 µg/dL in children who were not MSFWs.

Table 4.18 Children's Mean Blood Lead Levels (µg/dL) between Occupations

	Migrant Farm worker (N=9)	Seasonal Farm worker (N=18)	Not MSFW (N=11)	F-ratio
Mean	3.889	4.056	2.364	1.88
SD	2.369	2.940	0.674	
Median	3.000	2.500	2.000	

When data were disaggregated by sex, results revealed a significant difference in blood lead levels between female migrant farm worker children and female children who were not migrant or seasonal farm workers (Scheffé, $p < .05$). Maximum blood lead levels in migrant farm worker and seasonal farm worker children tended to be higher than in children who were not migrant or seasonal farm worker children. These mean levels were quite low compared to the standards which indicate that children with levels over 10 µg/dL may be at risk for developmental damage. There were some children who may be at risk based on the standard that is set to indicate risk.

Table 4.19 Difference in Female and Male Children's Blood Lead Levels (µg/dL) between Occupations

	Female			Male		
	MFW (n=5)	SFW (n=8)	Not MSFW (n=4)	MFW (n=4)	SFW (n=10)	Not MSFW (n=7)
Mean	4.200*	3.250	2.000*	3.500	4.700	2.571
SD	2.950	3.151	0.000	1.732	2.751	0.787
Median	3.000	2.000	2.000	3.000	4.000	2.000
Minimum	2.000	2.000	2.000	2.000	2.000	2.000
Maximum	9.000	11.000	2.000	4.000	10.000	4.000

*Significant difference at $p < .05$

No significant difference was found in mean cholesterol level (mg/100ml) between occupation groups (Table 4.20). Clients who were not migrant or seasonal farm workers had higher mean levels of cholesterol than the other two occupational groups. Seasonal farm workers had the lowest mean level of cholesterol. The variance in cholesterol levels was less for migrant farm workers than for the other two occupational groups.

Table 4.20 Difference in Mean Cholesterol (mg/100mL) between Occupations

	Migrant Farm Worker (n=30)	Seasonal Farm Worker (n=21)	Not MSFW (n=43)	F-ratio
Mean	192.867	186.095	210.837	1.419
SD	46.087	64.248	68.372	
Median	186.500	170.000	207.000	
Minimum	118.000	123.000	113.000	
Maximum	367.000	415.000	499.000	

Analysis of Variance revealed no significant difference in cholesterol between occupations when data were disaggregated by sex (Table 4.21). Female seasonal farm workers had the lowest mean level of cholesterol (175.091 mg/100ml) while female and male clients who were not migrant or seasonal farm workers had the highest mean levels.

Table 4.21 Difference in Cholesterol (mg/100ml) for Females and Males between Occupations

	Female			Male		
	MFW (n=14)	SFW (n=11)	Not MSFW (n=29)	MFW (n=16)	SFW (n=10)	Not MSFW (n=14)
Mean	203.214	175.091	210.724	183.812	198.200	211.071
SD	58.963	39.715	45.609	30.000	84.318	103.065
Median	178.000	166.000	210.000	191.500	178.500	187.500
Minimum	147.000	123.000	136.000	118.000	131.000	113.000
Maximum	367.000	230.000	333.000	242.000	415.000	499.000

The ANOVA did not reveal a significant difference in high density lipoproteins, low density lipoproteins, or triglycerides between occupational groups.

Table 4.22 Difference in LDL , HDL, and Triglycerides between Occupations

	Migrant Farm Worker	Seasonal Farm Worker	Not MSFW	F-ratio
LDL: (mg/dL)				
Mean	113.214	99.133	128.512	2.25
SD	34.909	34.645	58.978	
n	28	15	41	
Median	104.500	98.000	125.000	
HDL:(mg/dL)				
Mean	43.759	44.474	44.659	0.04
SD	11.243	16.834	14.014	
n	29	19	41	
Median	43.000	45.000	42.000	
Triglycerides: (mg/dL)				
Mean	176.900	205.810	167.302	0.92
SD	87.704	161.393	84.000	
n	30	21	43	
Median	166.500	149.000	163.000	

Sample sizes for occupational groups varied which affected significance levels using ANOVA to compare means between all three groups. Although it appears that there should be a significant difference between the groups the tests showed no significance ($p < .1115$).

Analysis of variance revealed no significant difference in levels of high density lipoproteins, low density lipoproteins, or triglycerides when disaggregated by sex between occupational groups.

Table 4.23 Difference in Female and Male Lipid Levels between Occupations

	Female			Male			
	MFW	SFW	Not MSFW	MFW	SFW	Not MSFW	F-ratio
HDL (mg/dL)							
Mean	51.538	43.700	47.250	37.438	45.333	39.077	0.037
SD	10.974	8.932	15.759	6.673	23.372	6.813	
Median	49.000	45.000	43.000	39.000	34.000	39.000	
n	13	10	28	16	9	13	
LDL (mg/dL)							
Mean	119.357	99.000	126.393	107.071	99.333	133.077	2.254
SD	43.891	39.975	47.792	22.876	28.353	80.139	
Median	102.500	96.000	122.000	115.000	100.500	125.000	
n	14	9	28	14	6	13	
Triglyceride (mg/dL)							
Mean	152.643	178.818	182.103	198.125	235.500	136.643	0.923
SD	82.483	81.852	79.303	89.136	220.386	88.123	
Median	135.500	170.000	178.000	192.000	124.000	110.00	
n	14	11	29	16	10	14	

No significant difference was found in mean hemoglobin between occupational groups (ANOVA). Seasonal farm workers had a slightly lower mean level of hemoglobin than migrant farm workers or clients who were not migrant or seasonal farm workers (Table 4.24).

Sample sizes for females and males by occupational groups varied so that calculation of significance was affected by cell size. While it appears that there should be significant differences for LDL between females, Scheffé tests revealed no significant differences between females in occupational groups (p .3005).

Table 4.24 Difference in Hemoglobin (g/mL) between Occupations

	MFW (n=50)	SFW (n=60)	Not MSFW (n=71)	F-ratio
Mean	13.260	12.957	13.254	0.596
SD	2.224	1.745	1.287	
Median	13.100	12.750	13.400	
Minimum	8.400	7.000	9.500	
Maximum	18.000	16.800	16.300	

When ANOVA was employed to test the difference in mean hemoglobin levels between females and between males, there was a significant difference in mean hemoglobin between females ($p < .02$) as shown in Table 4.25. A significant difference was also found between migrant female farm workers and females who were not migrant or seasonal farm workers (Scheffé $p < .05$). No significant difference in mean hemoglobin was found between males by occupation. The variance for male migrant farm workers was greater than the other two occupational groups.

Table 4.25 Difference in Female and Male Hemoglobin (g/mL) between Occupations

	Female			Male		
	MFW (n=30)	SFW (n=41)	Not MSFW (n=46)	MFW (n=20)	SFW (n=19)	Not MSFW (n=25)
Mean	12.383*	12.554	13.170*	14.575	13.826	13.408
SD	1.587	1.491	1.088	2.425	1.967	1.604
Median	12.600	12.600	13.300	15.000	13.700	13.400
Minimum	8.400	7.000	11.300	8.700	10.000	9.500
Maximum	14.600	14.900	16.300	18.000	16.800	16.200

*Significant difference $p < .05$

Mean glucose levels differed significantly between occupational groups (ANOVA, p=.0015). Mean glucose level was significantly different between migrant farm workers and seasonal farmworkers (Scheffé $p < .0107$). There was also a significant difference in mean glucose level between migrant farm workers and clients who were not migrant or seasonal farm workers (Scheffé $p < .0025$). Migrant farm workers tended to have higher glucose levels and a greater variance in mean glucose levels than the other two occupational groups.

Table 4.26 Difference in Glucose Level between Occupations

	Migrant Farm Worker (n=16)	Seasonal Farm Worker (n=19)	Not MSFW (n=39)	F-ratio
Mean	184.375[a,b]	113.789[a]	112.590[b]	7.153
SD	98.191	51.271	57.436	
Median	154.000	92.000	97.000	
Minimum	75.000	65.000	70.000	
Maximum	396.000	244.000	396.000	

[a] Significant difference at $p < .0107$
[b] Significant difference at $p < .0025$

Analysis of variance also revealed a highly significant difference between mean glucose levels (mg/dL) between females ($p < .0003$). The Scheffé test revealed a highly significant difference between female migrant farm workers and females who were not migrant or seasonal farm workers ($p < .0004$). A significant difference was also found between female migrant farm workers and female seasonal farm workers ($p < .0071$). Female migrant and seasonal farm workers on average had higher glucose levels than females who were not migrant or seasonal farm workers. No significant differences were found between mean glucose levels in males.

Table 4.27 Difference in Female and Male Glucose (mg/mL) Levels between Occupations

	Female			Male		
	MFW (n=10)	SFW (n=11)	Not MSFW (n=28)	MFW (n=6)	SFW (n=8)	Not MSFW (n=11)
Mean	192.00[a,b]	111.27[b]	104.04 [a]	170.17	117.25	134.36
SD	105.29	52.89	25.69	92.63	52.35	100.14
Median	158.00	91.00	97.50	139.50	93.50	92.00
Minimum	101.00	65.00	74.00	75.00	90.00	70.00
Maximum	396.00	244.00	184.00	317.00	241.00	343.00

[a] Significant difference $p < .0004$
[b] Significant difference $p < .0071$

Hypothesis Four

There will be no significant difference in the prevalence of disease or injury for migrant farm workers, seasonal farm workers, and clients who are not migrant or seasonal farm workers.

Frequencies for specific diseases were calculated. Migrant farm workers tended to have higher glucose levels. The counts do not represent recurrent bouts of a disease. In many cases, cell sizes precluded further analysis. Clients were counted as having a disease if during the 1993 year they visited the clinic regarding a specific disease. (They may have been diagnosed during 1992 for a disease.) Clients may have visited the clinic for one symptom and been diagnosed with something of a totally different nature.

Respiratory Diseases. Diseases of the respiratory system, ears, nose, throat, and sinuses were one of the most frequent reasons for visits to the clinic. Two hundred and three clients visited the clinic for respiratory disease treatment or disease symptoms including cough, congestion, sore throat, and children who were pulling at their ears and being fussy. Fifty-four migrant farm workers (27 females and 27 males) visited the clinic with symptoms of respiratory disease; 65 seasonal farm workers (31 females and 34 males); and 84 clients who were not MSFWs (43 females and 41 males).

Table 4.28 Diagnosed Respiratory Infections between Occupations

	MFW	SFW	Not MSFW
	n	n	n
Upper respiratory infection	23	19	34
Bronchitis	7	13	20
Otitis media	15	23	27
Conjunctivitis	3	7	13
Tonsillitis	0	1	5
Sinusitis	6	9	5
Pharyngitis	5	12	20
Total	59	74	124

Two hundred fifty-seven clients were reported to have respiratory diseases during 1993 (Table 4.28). One hundred twenty-four (62%) of these cases were in clients who were not migrant and seasonal farm workers. Migrant farm workers comprised 59 of the cases (29.5%) while seasonal farm workers had 74 cases (28.8%). Clients who were not migrant or seasonal farm workers were more likely to be diagnosed with respiratory diseases (upper respiratory infection, bronchitis, tonsillitis, sinusitis, pharyngitis) than the other two groups.

The most common diagnosis was "upper respiratory infection" for a total of 76 cases. Thirty-four (45%) of the cases were in clients who were not migrant or seasonal workers. Twenty-three of the cases (11.5%) were in migrant farm workers compared to nineteen cases (9.5%) in seasonal farm workers.

Sixty-five cases of otitis media occurred. Twenty-seven cases (41.5%) were in clients who were not migrant or seasonal farm workers compared to 23 cases (35.5%) in seasonal farm workers and 15 cases or twenty-three percent in migrant farm workers.

Sixty-three occurrences of sinusitis, pharyngitis, and tonsillitis were reported. Thirty cases (47.6%) occurred in clients who were not migrant or seasonal farm workers. Seasonal farm workers had 22 cases (35%) compared to 11 cases (17.4%) in migrant farm workers.

Forty clients visited the clinic for bronchitis. Half of the clients were not migrant or seasonal farm workers. Thirteen clients or 32.5% were seasonal farm workers compared to seven (17.5%) who were migrant farm workers. Two cases of asthma were treated in the clinic. One case was a migrant farm worker and the other a client who was not a migrant or seasonal farm worker.

Forty-three positive protein derivative (PPD) tests for exposure to the tuberculosis bacteria came back positive. Migrant farm workers accounted for 48.8 percent of the PPD+ tests compared to 37.2% for seasonal farm workers and, 14% for clients who were not migrant or seasonal farm workers.

Intestinal Parasites or Pathogens. Thirty-nine clients were diagnosed with intestinal disease. Gastroenteritis was reported in 21 of the cases (53.8%). Ten cases were reported in seasonal farm workers and in clients who were not migrant or seasonal farm workers. One case was reported for a migrant farm worker. One case of shigella was found in each of the three occupational groups. One client who was not a migrant or seasonal farm worker had salmonella while three had giardia. Intestinal worms were reported for 12 clients. Seven (58.3%) of the cases were found in seasonal farm workers while three cases (25%) were found in clients who were not migrant and seasonal farm workers and two cases (16.67%) were found in migrant farm workers.

Abnormal PAP Test Results. Eighteen PAP tests out of 57 done were abnormal. Fifty percent of the abnormal tests were found in women who were not migrant or seasonal farm workers. Migrant farm worker women had 27.78% of the abnormal PAP tests compared to 22.22% for seasonal farm worker women.

Urinary tract infections. Twelve cases of urinary tract infections were reported. Half of the cases were in migrant farm workers. Five of the cases (41.6%) were found in seasonal farm workers while one case was found in clients who were not migrant or seasonal farm workers.

Skin Diseases. Nineteen cases of dermatitis were treated. Nine of the cases (47.4%) were in clients who were not migrant or seasonal farm workers. Eight of the cases (42.1%) were in seasonal farm workers while two of cases were in migrant farm workers. Ten cases of scabies was treated. Four of the cases were in seasonal farm workers while three cases were found in each of the other two occupational groups.

Anemia. One hundred eighty-one clients were tested for hemoglobin levels (50 migrant, 60 seasonal, and 71 not MSFW). Testing was done for 117 females and for 64 males. Nineteen cases of anemia were diagnosed or existed during the study (seven female not MSFW, four female migrant and 3 male migrant, and three female seasonal and two male seasonal clients).

Overweight and Obesity. Four hundred and sixty-nine clients had weight and height measurements to use in calculating body mass index (BMI). A BMI of 25 to 30 was considered overweight and above a BMI of 30 was classified as obese. One hundred sixty-nine clients were calculated to be overweight or obese including 57 migrant farm workers, 52 seasonal farm workers, and 60 not MSFWs (Table 4.29).

Table 4.29 Distribution of Overweight and Obese Females and Males between Occupations

	Females				Males			
	MFW (n=25)	SFW (n=25)	NOT MSFW (n=39)	F-ratio	MFW (n=32)	SFW (n=27)	NOT MSFW (n=21)	F-ratio
Mean	30.213	29.813	32.600	1.928	28.978	28.545	30.779	1.835
SD	6.480	5.531	6.437		3.668	2.630	6.142	
Median	27.369	27.555	31.516		27.849	27.942	28.391	
Minimum	25.078	25.118	25.118		25.149	25.040	25.140	
Maximum	47.467	45.886	52.803		40.121	34.616	44.426	

Sixty-six clients had a BMI of 30 or greater and were classified as obese including 17 migrant farm workers, 18 seasonal farm workers, and 31 not MSFWs. Ninety-one Hispanics were overweight compared to three Russians, and nine Anglos. Fifty Hispanics or 12.7% of Hispanics were obese compared to two Russians and 14 Anglos. Eighty-nine females were overweight or obese including 25 migrant, 25 seasonal, and 39 not MSFW clients. Eighty males were overweight or obese including 32 migrant, 27 seasonal, and 21 not MSFW clients.

Diabetes. Twenty clients were diagnosed or were seen in the clinic for Type II diabetes including nine migrant farm workers (five females and four males), four seasonal farm workers (one female and three males), and seven clients who were not MSFWs (four females and three males). Most of the diabetic clients visited the clinic for maintenance or medication refills. Testing was done on some diabetics to determine glucose levels and medication effectiveness, and to assess compliance with treatment. Seventy-four clients had glucose tolerance tests done including 37 not MSFW, 14 migrant farm worker, and 17 seasonal farm worker clients. Seven clients did not have glucose levels taken during 1993 but were previously diagnosed as diabetic. Clients with diabetes were over the age of 27 and seven were less than age 38. Seven diabetics were age 53 or older. Hispanics accounted for 17 of the diabetes cases compared to three for Anglos. Ten of the 18 diabetics for whom a body mass index was available were either overweight or obese by WHO standards. One of the obese was Anglo and the remainder were Hispanic. Half were female and half were male.

Logistic regression analysis indicated that migrant farmworkers were 8.7 times more likely to have been diagnosed with diabetes than were seasonal farmworkers or not migrant and not seasonal farmworkers. Cell sizes were small so caution must be used to interpret the results.

Hypertension. Thirty-one clients were under care for or diagnosed with hypertension including six migrant (one female and five males), five seasonal (four females and one male), and 20 not MSFW clients (14 females and six males). A total of 376 clients had diastolic blood pressure assessed including 128 not MSFW, 121 migrant, and 127 seasonal farm worker clients. Twenty-six clients had diastolic pressures above 90 mm Hg which is considered an indicator for possible hypertension.

Heart Diseases. Five clients who were not migrant or seasonal farm workers were diagnosed in the clinic with angina, myocardial infarction and congestive heart failure. Clients were transferred to the emergency room for treatment. No similar cases were reported for migrant farm workers or for seasonal farm workers.

Cancer. Two cases of cancer were treated in migrant farm workers compared to one in clients who were not migrant or seasonal farm workers. Additionally, one adult male who was not a migrant or seasonal farm worker died from lung cancer in 1993.

AIDS. One male migrant farm worker had AIDS. He was well along in the course of the disease and suffered from many opportunistic infections. Nine tests for HIV were given during 1993. Four HIV tests were given to clients who were not MSFWs, one test to a male migrant farm worker, and four to seasonal farm workers (two to females and two to males). None of the cases were positive. Several clients were given the option of testing due to risky behavior and they declined.

Depression. Eight cases of depression were treated. Half of the cases were in clients who were not migrant or seasonal workers. Three of the cases were in seasonal farm workers while one case was a migrant farm worker.

Injuries. Thirty-seven injuries were treated in the clinic. Twenty-nine of the injuries involved males while eight involved females. Twelve of the injuries were in seasonal farm workers and included nine injuries to males. Lacerations occurred in 19 clients. Six of the injuries were due to motor vehicle accidents. One dog bite was treated

and the remaining injuries were due to falls, cuts, sprains and strains, punctures, and abrasions.

Violence. Twelve cases of violence were reported by clients. Six seasonal farm workers visited the clinic due to the results of violence, compared to four visits by migrant farm workers, and two visits by clients who were not MSFWs. Two of the violence cases involved males who were beaten in robberies or in random violence. Ten of the 12 cases were violence against women or girls. Three girls were molested or raped by family members. Seven cases were women who experienced domestic violence.

Summary

In summary, this chapter described the sample population and reported the results of statistical analysis, and testing of hypotheses. Hypothesis one was rejected because there were significant differences between occupational groups by age for females. Hypothesis two was rejected because there were significant differences between occupational groups for females in body mass index, systolic blood pressure, and in diastolic blood pressure. The third hypothesis was rejected because there were significant differences in hemoglobin and in glucose level for females between occupational groups. Hypothesis number four was rejected because the prevalence of obesity, hypertension, diabetes, anemia, and respiratory illness differed significantly between occupational groups. The following chapter discusses the results of this study.

CHAPTER V

DISCUSSION AND CONCLUSIONS

This chapter includes a discussion of the findings of data analysis, followed by conclusions based upon the findings. Major findings are discussed in four sections. The first section discusses the findings concerning the demographics of the sample population. The second section discusses the findings concerning physiologic measurements. Findings concerning biochemical measurements are discussed in the fourth section. The final section discusses diseases and injuries that were found in the sample population.

Major Findings

This study included three occupational groups stratified by sex. The study design consisted of a total sample size of 600 with 200 in each occupational group. Within the study sample, 511 or 85.17% were Latino, 29 or 4.88% were Russian, and 60 or 10.0% were Anglo. In the clinic population during 1993, Latinos comprised 81% of the patient population while Russians accounted for 5%, and Anglos made up 14%. The random sample represented about 4% more Latinos than the number that used the clinic in 1993, and included 4% less Anglos. The sample had about the same percent of Russians as the percent of Russians who used the clinic during 1993. This sample from the western migrant stream is much less ethnically diverse than the eastern stream. The ethnic composition found in this stream would not be similar to the eastern stream.

During 1993, following an earthquake and the condemnation of the building Salud Medical Center was housed in, the clinic was moved and housed temporarily in the armory and then in a vacant warehouse. Personal communication with Salud Medical Center staff indicated that some clients who regularly used Salud did not go to the clinic during the time

that the clinic was housed in the armory so that might affect the findings of this study. The sample seen during 1993 might be different than at other times.

Review of the medical records revealed that many clients go to county health departments as well as hospitals in the surrounding areas for acute and emergency conditions (i.e. otitis media, lacerations, severe bronchitis). Information concerning those visits will not, in many cases, be found in the records at Salud Medical Center. Additionally, the "healthy worker" effect may be seen where migrant farm workers who are sick or injured may not migrate so information about them will not be available.

Anecdotal evidence found in the medical records indicated that the staff of Salud Medical Center attempts to educate clients and spends time to learn about the situation that may affect the health of the clients. Many outreach visits and hours were spent on clients who needed social support, transportation, legal information, referral to specialists, financial support, and education and training. Staff went out of their way to provide care and support for clients. It was evident that the staff was a caring and committed staff.

Demographics

The median age of migrant farm workers in this study was 22 years, of seasonal farm workers was 22 years and, of clients who were not MSFWs was 24 years. These findings are similar to national and state statistics. The median age in Marion County in 1990 was 33.7 years and, the median age in people of Mexican heritage was 22 years (U.S. Census Bureau, 1993). The median age in Marion County of the non-Hispanic white population was 35.4 years.

Nationally, the median age for the Hispanic population was 26.4 in 1992 compared to 35.2 years for the non-Hispanic white population (Garcia, 1993). The median age for the Mexican population in the United States was 24.4 years (Garcia, 1993). The study sample is representative of the age of Mexican population in Marion County for seasonal farm workers. In the client population of not migrant or seasonal farm workers, the

median age of the sample is less than that in Marion County or in the nation. This finding could be due to the fact that more than 80 percent of people of Mexican origin were found in the group of clients who were not migrant or seasonal farm workers. In general, the median age of this sample was representative of the median age in the county and nation.

Many studies of migrant and seasonal farm workers have been conducted in the southern, eastern and midwestern parts of the United States. Some of the studies focus on females, males, or children. Mean ages have differed in many studies based on the composition of the selected sample. Shotland (1989) found the mean age for Hispanics to be 28.6; Littlefield and Stout found a mean age of 31.6; Watkins et al found the mean age to be 23.1 years. This study has a lower mean age than many of the previous studies.

Migrant and seasonal farm worker females tended to be younger that other clients where mean age for migrant farm worker females was about 19 compared to about 20 years of age for seasonal farm worker females and about 27 years for clients not MSFW. The migrant stream on the west coast is primarily comprised of families so perhaps that affects the lower mean age found in this study.

The sample had 52.83% of the clients who were between the ages of 15 and 44. This is slightly less than the clinic population has with 61% of the population between the ages of 15 and 44. Disaggregation of data revealed that clients who were not migrant or seasonal farmworkers and who were over fifty years of age accounted for 13.5% of the sample compared to five percent for migrant farm workers, and six percent for seasonal farm workers. This makes sense in terms of the fact that many older people do not migrate to do farm work and may no longer perform seasonal work in the resident population. Migrant and seasonal farm workers were more represented in the twenty to twenty-nine year old age group. Migrant and seasonal farm workers who need health care would probably seek care at a community and migrant health center (CMHC) while other clients may seek care at county health or a private provider in contrast to older clients on a fixed income who may rely on the CMHC for all of their health care. In the birth through five

year age group, nearly the same number of clients were found for each occupational group and represented between 23.5% and 26% of each occupational group. Illnesses and diseases found in the younger age groups are primarily infectious diseases and affect all children at about the same age (Dever, 1991).

Household incomes for all three occupations were similar and fell between a mean household income of $11,058 and $12,102 (n=443). The poverty threshold in the U.S. in 1993 for a family of four was $14,763. The household income in the sample does not indicate household size so it is impossible to determine actual poverty levels. Additionally, several members of the same household might visit the clinic so household income statistics are not very useful as found in this study. However, a 1987-88 needs assessment by the Oregon Migrant Head Start program found that farmworker families averaged $6,000 annually and that nearly 100% fell below the poverty level (Salud Medical Center, 1991). Additionally, 75% of the general user population was below the federal poverty income level.

The 1990 U.S. census shows that in Marion County the median household income was $26,876, and that 12.2% of households had incomes below the poverty level. Twenty-nine percent of Mexican families in Marion County had income below the poverty level and the median household income was $20,625. In Woodburn City, where Salud Medical Center is located, 15.2% of families were below the federal poverty line and, 35% of families of Hispanic origin were below the poverty level (U.S. Bureau of the Census, 1993).

It makes sense that the clients who use the services offered by Salud Medical Center represent the lower income groups of the community since community and migrant health centers were established in disadvantaged and underserved areas. It is clear that the majority of clients in this study fell below the poverty level by taking into account previous studies, the nature of the clinic (community health centers were designed to serve the needs

of the poor), earnings from types of work performed by the occupational groups, and anecdotal information gleaned from a review of records.

Migrant farm workers had a higher mean number of visits per person per year to the clinic with a mean of 4.02 visits compared to 3.42 for seasonal farm workers and 3.99 for clients who were not MSFWs. The Tulare study in California conducted in 1982 found that migrant farm workers made an average of 4.4 visits per person per year (Trotter, 1988). In 1988 the estimated total farmworker encounter per person in federally funded migrant health centers was 3.40 (OTA, 1990, p. 59). Rural residents see physicians on average 4.5 times each year (Richardson, 1987). The poor are less likely to seek health care services (Muller, 1988). The HHANES findings indicated that 31% of Mexican Americans had not received health care in the previous year compared to 28.3% for non-Hispanic whites (Littlefield and Stout, 1987).

When the data is disaggregated by sex, females made more visits to the clinic than did males. Females had 4.43 visits per person per year compared to 3.18 visits by males per person per year. These findings support studies showing that women visit health services more often than men do at least during child bearing years (Slesinger and Cautley, 1981). Poor women in the age range of 45 to 64 are less likely to see a doctor than are the non poor (Muller, 1988). Lillie-Blanton et al (1993) found that Latina Americans aged 18 to 64 with incomes less than $10,000 made 5.3 visits compared to 4.3 visits for women with incomes between $10,000 and $19,999. White American women were found to make more visits in both income ranges: 6.9 visits with incomes less than $10,000 and, 5.2 visits with incomes between $10,000 and $19,999.

Farm workers do not want to miss time from work and will often work until a health problem becomes too debilitating (Cole and Crawford, 1991). Richardson (1987) points out the rural residents tend to not seek health services for problems that require minimal care (i.e. acute ear infections, disorder of menstruation, parasitic diseases, and chronic childhood diseases). Cultural beliefs in this study population may also affect health

seeking or utilization behavior. Old Believers and traditional Mexican culture rely on home remedies and traditional healers (Hall, 1970; Reinert, 1986).

Many barriers exist to impair accessibility for the poor including migrant and seasonal farm workers. Transportation, availability of child care, hours the clinic is open, long waits for appointments, long waits in the reception area, language and cultural barriers, low levels of health insurance coverage, and distrust of the system (Slesinger, 1985; Trotter, 1988). Salud Medical Center works to overcome these barriers by opening the clinic during early and late hours in addition to the usual daily times of operations; by having tri-lingual and tri-cultural staff; by providing outreach which includes transportation; and by assisting and networking with other community agencies to provide services.

Physiologic Measurements

Physiologic measurements were not recorded on every visit for every client. Providers assessed height and weight on nearly all clients. There were some clients who did not have height and weight measurements taken. One person was too obese to get on the scales. Many older people who came in for routine maintenance who had been a regular client for years might not have had height and weight assessed. If someone presented in obvious distress providers might not have done height and weight measurements. Most children had a weight and height measurement taken. Some clients came in for the results of lab work or for refill of medications and their height and weight may not have been assessed. Blood pressures were taken when the reason for their visit would warrant that to be taken. Hypertension, a history of cardiac problems, pregnancy, and other conditions seemed to be reasons that providers took blood pressure measurements. Clinic and provider preference dictated what measurement were taken. Clients with these measurements recorded become a subset of the random sample and may skew the results to some extent.

Some differences in physiologic measurements did exist by sex and occupation. Females who were not migrant or seasonal farm workers had a higher body mass index compared to the other two occupations. This may be due to the types of work that require manual labor that migrant and seasonal farm workers perform compared to other types of jobs that not MSFWs may have such as factory or clerical work. Males had similar body mass indexes. Additionally, not MSFW females had significantly higher systolic blood pressure as well as significantly higher diastolic blood pressure. Higher blood pressure associated with excess weight is consistent with national studies. In spite of the fact that males who were not MSFWs did not have a higher body mass index, they had higher systolic and diastolic blood pressures than the other two groups. Further research is required to understand what factors might contribute to that finding. Tobacco usage might be one factor which would contribute to higher blood pressures and that information was not available for this sample population.

Biochemical Measurements

As with physiologic measurements this area also is made up of a subset of clients for whom providers felt the need to assess certain chemical levels. Cholesterol levels are assessed to determine risk of cardiovascular or cerebrovascular disease. Glucose levels were recorded for pregnant women who had prenatal care to assess the risk of gestational diabetes. Diabetics or people at risk for diabetes may have had glucose lab tests done. Hemoglobin tests were also often done on pregnant women to assess their risk of anemia. People who were tired and run down or sickly may have had hemoglobin tests done. Again, clinic and provider preference dictate what tests will be done based on assessments of the individual situation. Blood lead level tests were done on young children routinely in response to a state mandate to test children for lead. These results then are for a few select individuals that providers ordered testing for in contrast to the whole sample. These test

results are the indicators of disease for a group of clients who were felt to be at risk or who needed an assessment to determine possible causes for problem conditions.

Median cholesterol levels were found to be higher for males and females in the not MSFW group while median levels for female not MSFWs was higher but, median levels for male migrant farm workers was highest. Serum cholesterol levels in all three occupational groups were not on average found to be high compared to the general population and what is considered to be levels for high risk. This supports other research which showed that Mexican Americans (who make up about 85% of this sample) have a lower prevalence of high cholesterol (Lillie-Blanton, 1993). Low income migrant and seasonal workers who are primarily Latino may be eating a more traditional diet that includes vegetables, fruits, and grains that are low in fat. Acculturation and the length of time people of Mexican origin had been in the United States would impact on diet and it was not possible to assess that during this study.

Findings from this study indicate that children in this study may be at risk for lead poisoning. Blood lead levels ranged from 2 µg/dl to 11 µg/dl. Seasonal farm worker children had the highest mean blood lead levels with 11 µg/dl for girls and 10 µg/dl for boys. Migrant farm worker girls had a maximum blood lead level of 9 µg/dl while boys had a maximum level of 6 µg/dl . Mean levels for children who were not migrant or farm workers ranged from 2 µg/dl for girls to 4 µg/dl for boys. Elevated lead levels are defined as greater than 10 µg/dl (Oregon Health Division, 1994). Oregon had tested only 230 children and adolescents by the end of 1993. Labs kept anonymous results on all lead samples they tested for a total of 2299 children. Additionally an active lead screening program has been going on in four counties including Marion county since 1992. These counties were selected due to the low socioeconomic status of residents and the high percentage of homes built before 1940.

Another potential source of lead poisoning is found in home remedies. Greta and azarcon, remedies commonly used in traditional medicine for digestive problems, contain

lead. In cases where children have been found to have very high lead levels and the children are of Mexican origin remedies are often found as contributing or principal sources of lead (MMWR, 1993).

Elevated lead levels are defined as those that are greater than or equal to 10 micrograms per deciliter. The median and mean lead levels in this sample were well below that level although a couple of children in the MSFW occupations had elevated levels of lead. Low levels of lead exposure can result in impaired central nervous system functioning, delayed learning, and stunted growth.

While there was no statistically significant difference for hemoglobin level by occupation alone, there was a significant difference for females by occupation. Females who were migrant farm workers had a statistically significant lower level of hemoglobin than did females who were not MSFWs. Females who were seasonal farm workers also had lower mean and median hemoglobin levels than did females who were not MSFWs. These findings mirror findings in other studies where the poor, and particularly women and children, suffer from inadequate nutrition and resultant anemia (Shotland, 1989).

Glucose levels were found to be significantly higher for migrant farm workers. When data was disaggregated, the difference was found for females by occupation and not for males. This sample indicates that in a population that is primarily Latino, migrant farm workers had higher glucose levels and were more likely to be at risk for diabetes than were the other occupation groups. Further research is required to determine the reason that migrant farm workers had higher glucose levels than the other two groups. The fact that 60 clients in the sample were not of Mexican origin (at least as reported by clinic records) could have been sufficient to skew the results.

Diseases and Injuries

Two hundred and fifty-seven clients were diagnosed with or seen for diseases involving eye, ear, nose and throat diseases. Some of these clients had more than one

disease concurrently or at a subsequent time and the total number of diseases was 290. The diseases included upper respiratory infection, tonsillitis, sinusitis, pneumonia, strep throat, pharyngitis, conjunctivitis, bronchitis, asthma, and otitis media. Two hundred and three clients (33.83%) visited the clinic for symptoms that would indicate respiratory diseases including cough, congestion, sore throat, ear ache, and in the case of infants, pulling at the ears. Sixty-one of the cases of respiratory diseases were diagnosed in children ages birth to 10.

Respiratory infections are generally reported to be found more often in migrant and seasonal farm workers than in the general population (Meister, 1990; Rust, 1990; Shotland, 1989). As Rust and Meister pointed out, there is a lack of information about many of the acute and chronic diseases found in migrant and seasonal farm workers. Rust especially noted the dearth of information concerning the diagnoses of otitis media (OM) since that disease is one of the most common diagnoses given in office-based physician's offices in the United States. Schappert (1992) reported that for children less than age 15 otitis media is the most frequent diagnosis in office practices, especially among children less than age two and, there has been almost a 150% increase in the number of visits for OM since 1975. Dever (1991) found 5.9% of clients who visited migrant health centers in three states were diagnosed with otitis media. This study found that 65 clients were diagnosed with otitis media and, that fifty-four of those cases or 28.3% occurred in children aged birth to 10. Twenty-seven of the cases (41.54%) of the total were diagnosed in children age birth to two. The numbers of children ages birth to 10 by occupational group of their parent or guardian were 64 migrant, 65 seasonal and 62 not MSFW.

Otitis media left untreated can cause the eardrum to burst and can cause hearing impairment and delayed speech development. During records review, it was noted that many children were taken to emergency rooms for otitis media. Some of those clients were then seen in Salud Medical Center for follow-up but, many were not. Antibiotics have limited value in preventing recurrent episodes of otitis media (Williams, Chalmers, Stange,

1993). Otitis media is an example of an acute infection that parents or other clients will often seek treatment for because the symptoms are severe enough to require treatment, especially in the case of children. Treatment with antibiotics, however, does not eliminate in the disease in many cases. This study supports other research indicating that otitis media is especially prevalent in children under age two.

In the case of bronchitis, conjunctivitis, and upper respiratory infection (URI) children between the ages of birth and 10 were the clients diagnosed with the diseases in more than 50% of the cases. Children age birth to 10 accounted for 43% of the cases of pharyngitis. These diseases are all commonly occurring diseases in children worldwide and susceptibility is universal. Children under age 5 are most commonly infected with conjunctivitis (Benenson, 1990). The fact that fewer migrant children were diagnosed with these respiratory afflictions may mean that parents wait to go to emergency room for severe cases not that there are fewer cases in that occupational group.

PPD Reactivity. Forty-three (43%) positive protein derivative (PPD) tests for exposure to the tuberculosis bacteria came back positive. Migrant farm workers accounted for 48.8% of the PPD positive tests compared to 37.2% for seasonal farm workers and 14% for clients who were not migrant or seasonal farm workers. No active TB cases were found in this sample during 1993. These findings are consistent with the current situation in Salud Medical Center where only one active case of TB is known to exist (Stires, 1995). In Marion County during 1990, there were 12 reported cases of TB and in the other three counties in the clinic's service area there were 16 reported cases of TB (Oregon Department of Human Resources, 1992).

These study findings are similar to a study done in Virginia that revealed skin-test positivity rates of 39% and 48% in 1984 and 1985 (MMWR,1992). Research in North Carolina showed a positivity rate of 31% in migrant farm workers. Salud Medical Center does physicals for the immigration and naturalization service on a regular basis and does not find active cases of TB. Clinic staff was aggressive in their efforts to have clients put

on preventive therapy and to follow-up where possible to ensure compliance as recorded in the medical charts.

Risk factors for transmission of the TB bacteria includes living in the same household with an infected person and traveling in the same vehicle. Many migrant farm workers live in crowded conditions which may make transmission of the bacteria more effective. Additionally, travel is often done in crowded conditions.

Intestinal parasites and pathogens. Prevalence of many types of parasites and pathogens are indicative of people living in unsanitary conditions since many pathogens and parasites are transmitted via a fecal oral route. People of all ages who are suffering from malnutrition are susceptible to severe disease and death (Benenson, 1990). Adequate sanitation along with access to safe water are important in order to prevent many outbreaks due to parasites and pathogens. Salmonella can be transmitted as a result of eating food that is contaminated with feces or that is infected with *Salmonella.* bacteria. Tapeworms, shigellosis, giardiasis, and roundworms can all be transmitted through the fecal-oral route. A diagnosis of gastroenteritis often indicates a fecal-oral transmission route of pathogens. Consequences in children who are malnourished may be severe. Parasitic infestations can bring on anemia in pregnant women. All of these diseases are best prevented with proper hygiene which requires access to clean water and adequate sanitation. Migrant and seasonal farm workers often do not have access to either water or sanitation while working in the fields (Wilk and Hancock, 1991). Children accompanying adults to the fields would be exposed to the same conditions.

Studies have shown that parasites are found more frequently in migrant and seasonal farm workers than in the general population (Cole and Crawford, 1991; Wilk, 1986; Shotland, 1989). Many of the studies show increased rates above the 26% found by Feacham (1983) in Guatemala. This research revealed that thirty-nine clients were diagnosed with intestinal diseases including gastroenteritis, shigellosis, giardiasis, salmonellosis, and intestinal worms. This study found diagnoses of three cases of

shigellosis. One case was found in each of the three occupational groups. More diagnoses were found in seasonal farm workers and clients who were not MSFWs than were found in migrant farm workers where one might expect to find more. Remedies are often used to get rid of worms. Other diseases may not get treated or may be treated at another clinic or in the emergency room. Other studies involving screening in labor camps consistently have found that migrant farm workers were infected with intestinal pathogens and intestinal parasites (Ciesielski et al, 1993; Wilk, 1986) so, results of this study may not be representative of the situation for many migrant farm workers or other poor people who live in unsanitary environments. During 1990, 35 cases of shigellosis and 26 cases of salmonellosis were reported in Marion County (Oregon Department of Human Resources, 1992). Marion County had the highest number of reported cases of shigellosis in the state during 1990.

Urinary tract infections. Twelve urinary tract infections (UTI) were found including six in migrant farm workers, five in seasonal farm workers, and one in a client who was not a MSFW. Previous studies revealed rates of UTI that were 3 to 10 times higher in MSFWs than in the general population (Cole and Crawford, 1991; Wilk, 1986). Urinary tract infections are often common where people do not urinate over a long period of time and colon bacilli ascend from the bladder. Migrant and seasonal farm workers often do not have access to toilets in the fields and may not urinate for hours (Wilk, 1986). This is more often the case for females than for males. Chronic UTIs may lead to renal failure. In pregnant women, UTIs have been associated with fetal deaths, increased rates of miscarriages, and premature births (Wilk, 1986; National Advisory Council on Migrant Health, 1993). Urinary tract infections tend to be painful so people will often seek care eventually when the infection gets severe enough.

Abnormal PAP Tests. Nearly one third of all PAP tests done in the clinic during 1993 revealed abnormalities. Out of 57 PAP tests done, 18 were abnormal. Many of these

were due to abnormal cell growth or to human papillomavirus (HPV). HPV is highly associated with cervical cancer.

Dermatitis. Nineteen clients were diagnosed with dermatitis. Eight of the cases were found in seasonal farm workers, two in migrant farm workers, and nine in clients who were not MSFWs. Farm workers are routinely exposed to chemicals in plants and in pesticides. Skin rashes and other irritations are the most prevalent problem in all industries but especially in agriculture (Wilk, 1986). Clients may not choose to miss work to visit the clinic for this problem since often it is irritating but not disabling.

Scabies. Benenson (1990) indicated that a wave of scabies infestation has happened in the U.S. without "regard to age, sex, race, or standards of personal hygiene" (p. 386). Mites that cause scabies are easily passed from one person to another in close contact. There is rarely just one case in a household. Living in crowded conditions makes transmission more efficient. Ten cases of scabies were found in clients in this study including four in seasonal farm workers, three in migrant farm workers, and three in clients who were not MSFWs.

Anemia. Nineteen cases of anemia was found in this study sample. Eight of the cases were found in children ages birth to 10. Three cases occurred in clients ages 10 to 20 and the remainder in the sample who were older than age 20. Fourteen females or 11.9% of the 117 who had hemoglobin tests done were diagnosed or seen for anemia in the clinic. The number of females with anemia represented 4.66% of all females. Dever (1991) found that 1.6 of all females (n=4373) were diagnosed with anemia in migrant health clinics. Five males or 7.8% of males tested were diagnosed with anemia. Males who had anemia represented 1.6% of all males in the study. Dever found 1.8% of all males (n=2596) were diagnosed with anemia in migrant health centers. This study found a higher percentage of females and about the same percentage of males were diagnosed with anemia.

Anemia is often found in the poor populations of the world and can be an indicator of poverty (Jacobson, 1993). Anemia can also be associated with parasitic infestation

(Ciesielski et al, 1992). In the U.S., the prevalence of iron deficiency is greater in women who live below the federal poverty line than in women living above the poverty line (Greenstein, 1992). Anemia is often found in increased rates in poor children (Greenstein, 1992). Anemia has consistently been found to be one of the serious conditions in migrant farm workers (Trotter, 1988; Watkins et al, 1990; Dever, 1991; Meister, 1991; Shotland, 1989).

Malnutrition is often a factor in anemia. Malnutrition and it's effects such as anemia is prevalent in countries where the population doesn't have enough food for an entire year but only portions of the year (Ali, 1991; Durning, 1989). In Latin America, anemia affects from 14% to 30% of women of all ages (Chelala, 1991). Watkins et al found that 43% of migrant farm worker women (n=359) had low hematocrit. Findings of this research do not support Watkins findings. Shotland (1989) found that many migrant farm workers reported not having food or money to buy food at some point during the year. Anecdotal comments found in medical records during this study indicated that many clients regardless of occupation ran out of money during the year. This is a special problem for people in rural areas who often don't qualify for public assistance programs since families are often made up of two parent households with at least one paid employee in the household (Slesinger, 1991).

Overweight and obesity. Thirty-six percent of clients who had height and weight measurements taken during 1993 were classified as overweight or obese based on body mass index calculations. A fairly even distribution between the three occupational groups occurred for those who were overweight. Nearly twice as many clients who were not MSFWs were obese compared to the other two groups. Eighty-nine females (40.45%) were overweight or obese and 80 or 34.93% of males were overweight or obese. This is higher than the HHANES findings for Mexican American females (39%) and males (30%). The HHANES findings pertained to women and men between the ages of 18 and 74. Median height for women was 67.1 inches and 61.9 inches for men. In this study clients

between the ages of 18 and 74 had median heights for women of 61 inches and 65 inches for men. Measurement of weight to determine obesity must take into account several factors. Some minority populations have high-risk body fat distribution or upper body fat distribution which is more of a risk factor for some diseases than for others (Kumanyika, 1993). Measures other than BMI to measure obesity include subscapular skinfold and triceps measurements, and also waist to hip ratio.

Poverty and low educational attainment are associated with higher rates of obesity in women (Kumanyika, 1993) and in both males and females (Bray, 1992). Acculturation is also thought to be a factor in weight gain in a population. Mexican Americans have increased their fat content over time and eat less of their native foods replacing complex carbohydrates with fats and convenience foods (Urdaneta and Krehbiel, 1989). Ginzberg (1992) reports that one third of all Mexican American women are obese. This study supports Ginzberg's findings.

Diabetes. Mexican Americans are reported to have a rate of diabetes three times that of non Hispanic whites (Council on Scientific Affairs, 1991). The HHANES found that 23.9% of Mexican Americans ages 45-74 had diabetes (Council on Scientific Affairs, 1991). The San Antonio Heart Study found that in all age groups for which data are available that Mexican Americans had higher rates of diabetes than the general population (Urdaneta and Krehbiel, 1989). This study found 20 cases of Type II diabetes in the study sample. These findings do not support other studies nor do they represent what the situation is at the clinic. Salud Medical Center provides services to many more clients with diabetes than the findings of this study indicate. There are 377 cases that the Health Educator has documented (Ramirez, 1995). Many more go undetected because they don't get screened for diabetes.

Hypertension. Thirty-one clients or 8.24% of 376 who had blood pressures checked were under treatment for or were diagnosed with hypertension during 1993. Several studies have shown that hypertension has been the second most common diagnosis

made in migrant health centers (Meister, 1991). Hypertension often goes undetected. The poor don't often seek preventive health care and may not realize they have hypertension since there are often few symptoms of a problem. Women of Mexican ancestry had hypertension rates about 20% lower than white women in the HHANES results (Lillie-Blanton et al, 1993). Hypertension was the 13th leading cause of death of Oregon women in 1990 and caused 0.7% of deaths. Hypertension was not listed as a leading cause of death for Oregon males for 1990. An estimated 30% of American adults have high blood pressure which is a risk factor for coronary heart disease and stroke.

Heart Disease. Heart disease is the number one killer of Mexican Americans in America (Aguirre-Molina, Ramirez, and Ramirez, 1993), the leading cause of death in males and females in Oregon (Oregon Department of Human Resources, 1990). Five clients in the study sample were diagnosed with heart disease. All five were women who were not migrant or seasonal farm workers. One of the women had a history of hypertension. All of the five showed up at the clinic in a state that required emergency treatment. These findings mirror a study done in Seattle that showed that female victims of heart attack are likely to delay calling for help (Meischke, Eisenberg, and Larsen, 1993). Older women may perceive heart attacks as something that men have so they may not associate chest pain with a heart attack.

Cancer. Three clients were seen in the clinic for conditions related to cancer. One of the clients died of lung cancer. Thyroid cancer and cervical cancer accounted for the other two cases in two migrant farm worker women. Findings of this study do not reflect the current situation at the clinic where five patients are in the end stages of cancer (Ramirez, 1995).

Cervical cancer is the sixth most common cancer worldwide (Benenson, 1990) and occurs with a higher incidence in lower socioeconomic groups (Benenson, 1990). Latin American countries have the highest reported incidence of cervical cancer cases in the world (Ginzberg, 1992). Hispanic women in the United States have increased rates of cervical

cancer compared to the general population (Ginzberg, 1992). Ginzberg points out that this can be linked to inadequate access to and use of preventive services. On average, Hispanics have lower rates of other kinds of cancer than the general population (Ginzberg, 1992). Exposure to pesticides and other chemicals may increase risk for cancers of the lung, liver, and pharynx (Zahm and Blair, 1993) that might be associated with those exposures (Lantz et al, 1994). Cancer incidence and mortality data for migrant and seasonal farm workers are not available. Anecdotal evidence links pesticide use to lymphomas, childhood leukemia, and tumors (No Grapes, 1992).

Cultural barriers concerning embarrassment and shame associated with examinations may be reasons more clients don't get screened for cancer. Mexican American women have discomfort talking or visiting male providers (Lantz et al, 1994).

AIDS. One case of AIDS was found in this study. Currently there are two terminal cases at Salud Medical Center (Ramirez, 1995). Screenings are not routinely done in community and migrant health centers so it is not possible to determine the prevalence or incidence in client populations. Several clients in this study sample who had high risk behaviors declined testing. Many women were not offered testing according to the records so it is not possible to determine the prevalence in women. Several of the women clients in this study had a history of sexually transmitted diseases and they were not, according to the charts, asked if they wanted to be tested in many cases. Symptoms of HIV infection in women differ from those that males present for including cervical abnormalities, thrush, HPV, and pneumonia (Stine, 1995). When male migrant farm workers travel alone for work they often visit prostitutes and in fact in this study several males came in for a sexually transmitted disease following contact with one or more prostitutes. Their wives or partners who remain behind in the home base are at increased risk for infection. Latinas in the U.S. are nine times more likely to have AIDS than Anglo women (National Commission to Prevent Infant Mortality, 1993). Hispanics account for 17.7% of the AIDS cases in the U.S. (Stine, 1995).

An observation from the study was that on the charts women often had information recorded concerning method of contraception while for males that line was often marked "na" for not applicable. In this day and age of HIV and AIDS sexual protection applies to both males and females where in many cases the only risk factor for women is being married (Berer and Ray, 1993).

Depression. Eight cases of depression were treated in the sample during 1993. Research in Tulare County, California of 1000 migrant families reported that 29% of migrants suffered from some form of mild psychological distress and that 1.4% had serious mental problems (Trotter, 1988). Studies show that in general, many stressors exist in rural areas due to financial instability, inadequate housing, and inadequate or inappropriate services (Bokemeier and Garkovich, 1991). Of the eight cases of depression found in this study, half were in clients who were not migrant or seasonal farm workers and three were found in seasonal farm workers. These cases were related death of loved ones, post partum depression, sexual abuse, and loss of health and job. Several of the cases of depression as noted by anecdotal comments in the records, were not the primary reason for visiting the clinic. Information about depression came out after examination for another reason.

Injuries. One of the highest injury rates in industry occurs in agriculture (Slesinger, 1991). This study found that lacerations accounted for 51.35% of injuries in the sample. These types of injuries might be common among those working in fields hand-cutting crops like broccoli or cauliflower where speed determines wage earnings. Many people with serious injuries would not show up at the clinic but would go to an emergency room (McDermott and Lee, 1990). Several of the cases in this studies, particularly the lacerations and motor vehicle accidents, were follow-ups from emergency care. Meister (1991) reports that injuries are not well documented for migrant and seasonal farm workers. One study from South Carolina indicates that 13% of visits (n=132) by males to

the migrant clinic were due to injuries (McDermott and Lee, 1990). Most of the injuries in that study were related to personal violence.

Six motor vehicle accidents were found to have occurred and caused injury in clients in the study sample. Some of the motor vehicle accidents in this study occurred as farm workers were going to or from farm work. Other accidents occurred in the course of daily activities. Motor vehicle accidents often occur in rural areas on rural roads (Slesinger, 1991) and rural populations are more effected than urban populations by motor vehicle accidents (Munoz et al, 1992).

Violence. Thirteen clients or 2.16% of all clients in this study reported or were seen as the result of violence. Two of the cases involved males who were beaten up and 10 of the cases involved domestic violence, rape, or molestation of females. One teenage male reported sexual abuse by a male relative. Anecdotal information in medical charts indicated that there were other suspected but unreported cases of domestic violence and child molestation. Rust (1990) reported family violence as an area with many unanswered questions. Cole and Crawford (1991) found that family violence needed to be addressed.

Summary

Previous studies demonstrated that the health status of migrant and seasonal farm workers is less than that of the general population. Many of the earlier studies were done on the east coast in North Carolina, Virginia, or Florida. A few studies were done in Wisconsin, Indiana, Colorado, and Utah. The purpose of this study was to provide information about migrant and seasonal farm workers in the western stream and to compare information about other poor people with similar income levels.

Information collected during 1993 in medical charts for 600 clients in a Community and Migrant Health Center was abstracted into a statistical dataset. Data were obtained for 200 migrant farm workers, 200 seasonal farm workers, and 200 clients who were not

migrant or seasonal farm workers including 100 females and 100 males in each group. Clients were of Latino, Russian, or Anglo culture.

The data were analyzed using appropriate statistical procedures. These procedures included frequency tables, analysis of variance, post hoc tests to compare multiple means, logistic regression and chi square to determine odds ratios. Results showed that in a mostly Latino population there were some differences between migrant, seasonal, and other clients in some cases and not in others. Clients who were not migrant and seasonal farm workers tended to be a little older than the other two occupational groups and females tended to be younger than males. The majority of clients in this study were near the poverty level and seasonal farm workers tended to have a higher household income. Migrant farm workers on average visited the clinic more often than the other two groups and, females visited more often than males. Many of the symptoms that caused people to go to the clinic were the same for all three occupational groups.

Anglos tended to be taller and heavier compared to Russians and Latinos. Females on average had a higher body mass index than males. Female clients who were not migrant or seasonal farm workers on average had significantly higher body mass indexes. Not surprisingly then, clients who were not migrant or seasonal farm workers had on average higher systolic and diastolic blood pressures and, females not MSFWs had significantly higher pressures than females in the other two occupational groups. Cholesterol levels were also higher in clients who were not MSFWs.

Blood lead levels in children on average were higher for migrant and seasonal farm worker children. Female migrant and seasonal farm workers had lower hemoglobin levels and higher glucose levels than females who were not MSFWs. Seasonal male clients were more like males who were not MSFWs than like migrant farm workers in body mass index, cholesterol levels, hemoglobin level, and glucose level.

Upper respiratory problems were common reasons for female and male clients in all three occupational groups in nearly even numbers to visit the clinic. Clients who were not MSFWs had more respiratory infections diagnosed than the other two groups.

Several diseases that are found in poor people more frequently than in the general population were found in this study. Intestinal parasites or pathogens commonly found in conditions with inadequate water and sanitation around the world were found in all three occupational groups. Urinary tract infections were found much more frequently in migrant and seasonal farm workers. Female clients who were not MSFWs had more abnormal PAP test results than women in the other two groups. Chronic diseases including hypertension, heart disease, diabetes, cancer, and AIDS were found in small numbers in the clients who visited the clinic.

Two types of injuries were found most often. Males visited the clinic for lacerations more often than did females. Follow-up care for motor vehicle accidents were the reason seasonal and not MSFW clients visited more often than migrant farm workers. Violence against girls and women was more often found in migrant and seasonal clients.

Anecdotal information was gleaned during the records review. Outreach was used extensively by clinic staff to educate clients, to follow-up on care, to provide transportation to the clinic for appointments, to offer condolences following a death in the family, to provide diabetic counseling and education, and to provide home care for pregnant women or other clients. In several cases there were more than 20 outreach contacts for some clients. Outreach included telephone calls, home visits, mailings, networking to assist clients with transportation, mobile clinics for camp screenings, late night clinic hours, and social services. In some cases money came out of providers own pockets to assist clients with medicine, food, housing, and transportation. Certified nurse midwives made prenatal and postnatal home visits to not only provide counseling, education, training, and social support. Lay health workers provided training and education in the clinic, in homes, and at

migrant farm camps. Pesticide training and education was conducted for farm workers and for farm owners or managers.

Conclusions

The following conclusions are based on the findings of this study. First, data concerning the health status of migrant and seasonal farm workers should be disaggregated by sex to accurately assess the health status of workers in those occupational groups.

Second, a comparison group of similar poor people should be used to attempt to assess health status of migrant and seasonal farm workers in relation to income, occupation, and living conditions. Clients who select Community and Migrant Health Centers are in a similar income range and may live in similar kinds of environments. Migrant and seasonal workers are exposed to chemicals other clients may not be exposed to so a similar group for comparison may provide useful information. Seasonal farm workers in many ways may be more similar to clients who are not migrant farm workers than who are migrant farm workers. Many previous studies indicated migrant farm workers are different than others as Galarneau pointed out. Based on this study, migrant farm workers are poor people who work hard and don't or can't take time out to go to the clinic for health problems. It was clear from anecdotal information that the staff at Salud Medical Center was stretched in terms of time and money to provide for the clients they see yet, there are many more who do not visit the clinic because they do not have the money to pay for the visit who should seek preventive care.

Third, household based research would be beneficial to assess income levels, occupational and environmental exposures, access to health care, and disease patterns. Ideally, a study like this one would examine the records of all people in the household and conduct interviews to learn about perceived health status and documented health status.

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